regulations are amended. The coconut beetle and the coconut red weevil occur throughout the Colony, but as a rule only cause damage on neglected properties. During the year some bad outbreaks of coconut beetle have occurred upon well cultivated estates, but in every case the recommendations of the Department have been followed and the pest rapidly controlled. Again I must draw the attention of the coconut industry to the number of dead palm stumps which are to be found in several districts. These and infected estates or gardens are a menace to the industry, and it is essential that all progressive growers should co-operate and assist the Department and the Revenue Officers in their efforts to safeguard the industry against any possibility of epidemics of pests or diseases.

52. In view of the endeavour to establish cotton as an economic crop in Ceylon, special attention has been given to the pests of cotton, and several samples of diseased plants have been submitted to the Department for examination and report. Pests so far have not been serious, but if the area under cotton expands, it will be necessary, in order to safeguard the industry against the ravages of the pink boll worm, to proclaim a " close season " in which no cotton shall be left growing.

53. Some outbreaks of paddy swarming caterpillar have occurred during the year, and have been the subject of investigations by officers of the Department.

COMPETITIONS.

54. Efforts have been continued during the year towards increasing food crops by means of prize-holding competitions. These have been arranged in the various districts, and have been under the supervision of Divisional Agricultural Officers and Agricultural Instructors. The various Food Production Committees consider the general lines under which these competitions should be held, and discuss the results with the various agricultural officers concerned. The number of entries in these competitions is yearly increasing, and the work of competitors is showing considerable improvements. Several districts have asked that competitions should be arranged for in respect of village cultivators' crops, such as tobacco, cacao, plantains, &c. I am convinced that if funds could be provided, and if satisfactory arrangements are made for periodic instruction to the competitors and for the careful judging of plots, much improvement of village agriculture could be effected by means of these competitions. Improvements in paddy cultivation and vegetable growing is already apparent as the result of competitions arranged.

55. Several prizes have been contributed by private donors for these competitions, and I desire to thank all who have contributed such prizes. In particular, the thanks of the Department are due to Dr. Brito Babapulle for his gold medal offered for a paddy competition amongst members of Co-operative Credit Societies in the Northern Province.

AGRICULTURAL SHOWS.

56. Agricultural shows were held during the year at the following centres :—Hiniduma, Hikkaduwa, Bentota, Weligama, Tissamaharama, Horana, Bellana, Matugama, Panadure, Trincomalee, Batticaloa, Nuwara Eliya, and Gampaha.

There is now a tendency to make these shows limited to small areas and to encourage exhibits from small growers. I am satisfied that these small shows do tend towards the encouragement of better agriculture amongst the village cultivators. Some very fine exhibits of paddy, vegetables, and dry grains were made at these shows. Particular mention should be made of the very fine show at Weligama held in July. This was one of the best shows I have seen in Ceylon, and its success is a credit to Mudaliyar Ilangakoon and those associated with him in its organization. More and more of the detailed work in connection with agricultural shows is falling upon officers of the Agricultural Department, and work in this connection was particularly heavy in the Southern Division during the year. It is gratifying to note that liberal donations are made to show funds by private donors, and the thanks of the Department are due to such individuals for their support of efforts aiming at the general improvement of village agriculture.

AGRICULTURAL EDUCATION.

57. The work of the Agricultural School at Peradeniya is given in detail in Annexure VII. Some re-organization of the work of this school has been made during the year, whereby it has been possible to allow students in their second-year time to tackle definite problems on which to submit a thesis in their final examination. Such a course helps to encourage powers of observation and to encourage students to become more self-reliant in their work. The first-year students still do regular plot work, but second-year students now carry out estates work, and have shown a keen interest in the experimental work with paddy that has been carried on at the school. The number of students at the end of the year was as follows :—First-year 18, second-year 14. The prize day at the school was held on August 5, when Mrs. W. L. Kindersley kindly distributed the prizes. The report presented at this prize distribution was as follows :—

This is the fifth prize-giving which has been held at the School of Tropical Agriculture. The last prize-giving was held on September 24, 1921, when the new school building was opened by His Excellency the Governor.

Since then three final examinations have been held: one for headmen in December, 1921, another for the Government Vernacular Teachers' Class, and the third for the second year English class in March, 1922. For the English Class examination 17 students presented themselves. The results were as follows : Passes 12, partial passes 3, failures 2. In the pass list, 1 student gained a First Class, and 6 students Second Classes. It is to these students that prizes and certificates are being given to-day.

In all 129 students have passed through this school and gained certificates, and of these 30 have found employment in the agricultural services of Government. Others are doing very good work upon estates, several are cultivating their own lands, whilst some have secured employment in spheres non-agricultural.

The new school year commenced in May last, when two new classes were found. The first year class on the English side is now composed of the full complement of 20 students, and the Vernacular Teachers' class is composed of 12 men. The full strength of the school at present is 46.

The students of the Training Colony, Peradeniya, still continue to attend the Saturday morning class, and a paper on agriculture is set them at the end of each session.

The post of Registrar of the school, which hitherto had been a temporary one, was finally abolished at the end of last year ; and consequent upon the departure of the Registrar in December, Mr. J. C. Drieberg, who had been connected with the school from its inception in 1916, was appointed in charge of the school and hostel as Farm School Officer, under the general supervision of the Divisional Agricultural Officer. To Mr. St. L. H. de Zylva, who had been Registrar for the past six years, is due the credit of an organization which made for efficiency. He was ably supported in his work by his wife, and it is with the deepest regret that I have to record her early death, after a brief illness. Mrs. de Zylva identified herself with the activities of the school and took a keen personal interest in the students.

Mr. C. Canagaratnam, who had been on the staff since October, 1919, left last December on being appointed Assistant Manager, Dry Zone Experiment Station, Anuradhapura. Mr. C. Wickremaratne continues to be in charge of the work of the Vernacular Teachers' class. Mr. G. V. Wickremasekera, one of the past students of the school, who had been awarded a scholarship to Poona for further training, was appointed to the school as Assistant Farm School Officer in October, 1921. Mr. E. S. de S. Jayasundera, who is receiving a prize to-day, has volunteered his services to the school for a short time and assisted the school officers in their work both in the field and in the laboratory.

The lectures in estate accounts since January, 1922, have been taken by Mr. Claude Pereira, Accountant, Pallekelley estate.

Some re-organization of the work of the students has been made during the year, in order that more practical work should be provided. Additions are being gradually introduced so as to make the course more attractive as well as more instructive. A commencement has been made with bee-keeping. Poultry, thanks to a donation from the Hon. Dr. H. M. Fernando, will be installed shortly, and, if funds permit, the building of the cattle shed for a small dairy will be taken in hand in October.

The students continue to go regularly to the Experiment Station, Peradeniya, for planting demonstrations conducted by the Manager of the Station ; and to the Botanic Gardens for demonstrations in horticulture conducted by the Curator. Lectures on co-operation are given at the school by the Secretary, Board of Control, Co-operative Societies.

The work continues to be satisfactory, though it is desired that students who came to the school should do so with a more definite object in view, and should apply their energies in the direction of the practical side of agriculture.

Work on the plots and the paddy field is solely the work of students. They also tap and prepare the rubber on school property, and have recently taken over an additional block of about 4 acres tea and rubber. Practical work in these areas is being made an important part of the work of the students' second year.

The school frontage is slowly undergoing reformation, and an additional tennis court is in the course of construction.

The school proceeded on the annual tour in February last to Colombo, Negombo, and Kalutara, and spent a week visiting places of agricultural interest. Whilst at Negombo for two days the students were the guests of Mr. J. E. P. Rajapakse. Occasional visits have been taken by students to the Peradeniya Chocolate Factory, New Peradeniya Estate Tea and Rubber Factory, to the Kandy Seminary Farm, to the Ross and Lochnagar estates, and to the new Experiment Station at Nalanda.

Athletic sports are being held under the auspices of the school and of the Old Boys' Union for the first time. The Indo-Ceylon Trading Company have very generously offered a silver challenge cup, to be won twice in succession before it passes from the safe keeping of the school.

To all who have assisted by the offer of prizes the best thanks of the school are due.

The award list this year includes, for the first time, " the Governor's Prize," presented by His Excellency the Governor for general efficiency in practical agriculture. The school recognizes the importance of the offer of this prize by His Excellency. It demonstrates his keen interest in agriculture and will encourage students in their practical work. Gate Mudaliyar A. E. Rajapakse again offers the " Rajapakse Gold Medal " for the best of all-round student of the course ; and we are indebted to him for his continued interest in the welfare of the school. For the prizes which are to be presented this afternoon we have to express our most cordial thanks to His Excellency the Governor, Gate Mudaliyar Rajapakse, and the following gentlemen :— Sir Solomon Dias Bandaranaike, Hon. Dr. H. M. Fernando, Hon. Mr. H. L. de Mel, Maniagar V. M. Muttukumaru, Mr. R. Salgado, Mr. W. A. de Silva, Mr. Graham Panditasekera, Mr. J. C. Ratwatte, and Muhandiram N. Wickramaratne.

The interest of agriculturists in the work of the school is essential to our progress and to the progress of agriculture in the Colony. Throughout the past year the number of inquiries addressed to the Department of Agriculture for information upon pests and diseases, manuring, cultivation problems, new products, &c., has increased to a very large extent, and it is with pleasure that I can record that an increasing number of inquiries are coming in from Ceylonese agriculturists. In many cases these inquiries can be traced to the work and efforts of past students of the school. This is a healthy sign. It indicates that students as they pass out from the school do not forget that they are entrusted with the spreading of scientific knowledge concerning agriculture throughout the various districts of the Colony, and I look forward to the time when it will be possible to establish and equip further agricultural schools and also to provide for higher and fuller courses in Agricultural Science.

On behalf of the school I have to extend a hearty welcome to Mr. W. L. Kindersley and Mrs. Kindersley. I have to thank you, Sir, for presiding over the prize-giving, and Mrs. Kindersley for so graciously distributing the awards and certificates. I also have to thank Mr. W. A. de Silva for the address he has promised us this afternoon.

58. A special course of training for vernacular teachers was held during the year. In this course 12 teachers from Government vernacular schools received special training. Their work throughout the year has been good and their progress satisfactory. This course of training at Peradeniya is becoming increasingly popular amongst teachers in Government vernacular schools, and the number of applications for admission is yearly increasing.

59. The work in the school gardens attached to vernacular schools has, as a whole, continued to improve during the year. Considerable improvement has taken place in the Colombo District, where work during the previous year did not come up to the requisite standard, and marked improvement has likewise taken place in the school gardens of the North-Western Province, largely as the result of the competition for the Hon. Lieut.-Colonel Wright's prize.

Increased activity in the establishment of home gardens has been noted in those districts in which awards were made last year, but there are some districts where home gardens have not developed to any extent.

The number of registered school gardens is now as follows :—

	1922.	1921.
Central Agricultural Division (Central Province and Kegalla District of the Province of Sabaragamuwa) ..	138	116
Southern Agricultural Division (Southern Province and Kalutara District of the Western Province) ..	117	116
Northern Agricultural Division (Northern, North-Central, and Trincomalee District of the Eastern Province) ..	32	32
Western Province, Colombo District	49	42
North-Western Province	78	72
Ratnapura District of the Province of Sabaragamuwa ..	30	30
Province of Uva	25	25
Batticaloa District of the Eastern Province ..	10	10

During the year a largely increased list of implements has been made to school gardens in all districts, and the equipment has thereby been very materially improved. The expenditure on implements for the financial year 1921–22 amounted to Rs. 6,719·63 ; seeds and plants to the value of Rs. 2,097·29 were also sent to the schools gardens ; but all teachers are encouraged to reserve stocks of seed from crops grown in the gardens for use in subsequent seasons, and distribution amongst pupils who are undertaking the cultivation of home gardens.

Awards of prizes for schools gardens to the value of Rs. 2,590 during the financial year 1921–22 were distributed as follows :—

	Special.	First.	Second.	Third.	Certificates.
Kandy District	—	5	8	7	5
Matale District	—	—	1	2	4
Nuwara Eliya District	—	1	2	1	4
Kegalla District	—	3	3	6	5
Kalutara District	—	2	3	13	5
Galle District	—	—	4	10	2
Matara District	—	2	4	11	4
Hambantota District	—	—	3	7	2
Anuradhapura District	—	1	4	5	4
Mannar District	—	1	—	—	1
Mullaittivu District	—	1	2	1	—
Colombo District	1	3	7	14	—
Kurunegala District	1	4	5	10	—
Chilaw-Puttalam District	—	1	3	3	—
Ratnapura District	—	2	7	11	—
Uva District	—	1	4	7	8
Batticaloa District	—	1	2	1	—

The awards of prizes for home gardens to the value of Rs. 789·50 during the financial year 1921–22 were distributed as follows :—

	First.	Second.	Third.	Certificate.
Kandy District	10	10	10	—
Matale District	2	2	2	—
Nuwara Eliya District	3	3	3	—
Kegalla District	5	5	5	—
Kalutara District	10	4	—	5
Galle District	7	5	—	10
Matara District	10	5	—	8
Hambantota District	5	2	—	3
Colombo District	15	16	15	—
Kurunegala District	1	17	3	—
Ratnapura District	11	21	20	—

Certificates were also issued to all winners of prizes.

It is felt that teachers do not as yet make sufficient use of the plants growing in the school gardens for lessons in the schoolroom, but this will be improved as the result of close attention by inspectors, and of the improved training that selected teachers are receiving at the School of Tropical Agriculture, Peradeniya.

Extension Work.

60. Most countries are now recognizing that extension work is of the utmost importance in efforts at agricultural improvement and expansion. This work consists of agricultural instruction, co-operative experiments upon farms, special technical instruction, lectures, demonstrations, &c. It is one of the most difficult duties of an agricultural department, and it is one in which progressive countries are now making the closest inquiries of what is being done in other parts of the world. Agricultural extension work strives to meet the requirements of the agriculturists for scientific and practical information along agricultural lines. Such information is placed before the public by means of agricultural advisors, organizers, instructors, demonstrators, and through agricultural clubs, extension schools, and personal interviews on the farms themselves. No country has done more in this service than the United States of America, and most agricultural colleges now provide special courses of training in agricultural extension work. In Ceylon, a small beginning was made with this work by the Agricultural Society through its Agricultural Instructors, but the work was not sufficiently organized, nor were sufficient instructors available for a colony of the size of Ceylon to make rapid progress. Some good, solid progress was, however, made, and in the past two years, with the appointment of Divisional Agricultural Officers, the Department of Agriculture has been able to make more rapid progress. The work of agricultural instruction is being more systematically organized, more attention is being given to competitions amongst village cultivators, demonstrations are being increased in number, lectures organized, instruction in bee-keeping provided, the economics of the industries of small growers investigated, and special attention given to co-operation. A beginning has also been made in the organization of village improvement agricultural societies. These will be affiliated to the District Agricultural

Committees which are being formed out of the Food Production Committees, and which will be closely associated with the Board of Agriculture. In this manner it is hoped to assist in the development of village agriculture, and any voluntary assistance from estate owners interested in the development of village agriculture in their vicinity will be of value to the Department. Details of the work of Divisional Agricultural Officers and their staffs and of Agricultural Instructors attached to Head Office will be found in Annexure VII.

Botanic Gardens.

61. Full details of the work of the Botanic Gardens are given in Annexure IX. At Peradeniya special attention was given to the general maintenance in view of the visit of His Royal Highness the Prince of Wales. His Royal Highness made a short tour of the Gardens in the morning of March 24 and planted a munamal (*Mimusops Elengi*) tree in commemoration of his visit. The centenary of these Royal Botanic Gardens at Peradeniya was celebrated at the same time, and a special illustrated historical account of the Gardens and of their work was prepared. The improvement of the arboretum continues, and special attention continues to be given to the section devoted to conifers. The work of extending and improving the fernery has also begun during the year. The nurseries have also been materially improved, and attention given to the budding of rubber. The flowering of eight talipots (*Corypha umbraculifera*) has been an outstanding feature during the year.

62. At Hakgala the new rockery has been the centre of attention. This rockery has now become well established and is a welcome addition to the Gardens. Several new rock-loving plants have been established and appear to be thriving well. Steps are also being taken to provide adequate space of a good collection of *Berberis* raised from seed supplied of the Royal Botanic Gardens, Kew.

63. At Henaratgoda planting of grafted mango and selected coconuts was carried out, and a general improvement of the nurseries undertaken.

Co-operation.

64. Progress is being made with co-operation, except in the Kandyan districts. A separate and detailed report is issued later in the year, when the accounts of the different societies have been checked and audited. The training classes which were held during the year at Colombo, Kandy, Galle, Matara, Matugama, and Panadure were well attended, but I regret to record that but small interest is taken in the co-operative movement by the educated leaders of the country and by those who should be concerned with the welfare and improvement of the rural population. If greater interest were shown by educated classes much more progress would be made. Another handicap to development is the unpunctuality of repayment of loans, and this feature of the movement has received special attention by all co-operative officers of the Department during the year.

Seed Distribution and Publications.

65. The requests for seed continue to increase, as also does the demand for publications. Large quantities of seed have been distributed free to village cultivators and to school gardens, and large numbers of leaflets and vernacular magazines have been distributed free to schools, co-operative credit societies, and to small growers.

The following publications were issued during the year :—

The " Tropical Agriculturist," Vols. LVIII. and LIX.
The " Govikam Sangarawa," Vol. XVI., Parts 7–12, and Vol. XVII., Parts 1–6.
The " Kamat Tholil Velakkam," Vol. XVII.
Annals of the Royal Botanic Gardens, Peradeniya, Vol. VII. Part IV., June, 1922.
Additions to Ceylon Fungi and Entomogenous Fungi, by T. Petch.
Centenary of the Royal Botanic Gardens, Special Edition.

Bulletins of the Department of Agriculture.

No. 52.—Preliminary List of Diseases of Cultivated Plants in Ceylon.
No. 53.—Nut Fall of Coconuts.
No. 54.—The Treatment of Buried Prunings on Shot-hole Borer Infested Estates.
No. 55.—Improvement of Yield in Hevea by the Selection of Seed Bearers.
No. 56.—The Effect of Manure on the Shot-hole Borer of Tea.
No. 57.—A Contribution to the Study of the Paddy Soils of Ceylon and Eastern Countries.
No. 58.—Some Preliminary Notes on the Coconut Caterpillar in Ceylon.
No. 59.—A Preliminary Report on Paddy Fly Investigations.
No. 60.—Damage caused to the Tea Bush.

Leaflets.

No. 19.—Cotton Cultivation (English, Sinhalese, and Tamil).
No. 20.—Coconut Caterpillar.
No. 21.—Black Beetle.
No. 22.—Red Weevil or Palm Weevil.

General.

67. The Director of Agriculture served as a Nominated Official Member of the Legislative Council during the year, and was Chairman of the Committee of that Council which dealt with the allocation and distribution of seats. He was also a member of the Salaries Revision Committee. He also acted as a member of the Commission appointed to consider the Forest Ordinance and the future forest policy of the Colony.

68. In addition, the Director of Agriculture was a member of the following Committees :— University College Council, Academic Committee, Statistical Council, Nachchaduwa Development Committee, Ratmale Colony Committee.

The attendance at meetings of these Committees absorbs a considerable amount of time, and makes it difficult to keep the office work of the Department of Agriculture as up-to-date as could be desired. If this work continues to increase at its present rate, the appointment of an Assistant and Deputy Director of Agriculture cannot be long delayed.

OPENING OF NEW LABORATORIES.

69. His Excellency the Governor at the opening of the new entomological and mycological laboratories at Peradeniya on October 10 referred to the useful work that was being accomplished by the staff of the Research branches. He also intimated that it was hoped that the building of a chemical laboratory would be undertaken as soon as funds permitted. This chemical laboratory is urgently required by the Department, as there are several research problems in agricultural chemistry that require to be tackled.

EXPENDITURE.

70. The following is a statement of expenditure for the financial year 1921–22 :—

	Rs.	c.
Salaries	217,390	45
Travelling	57,802	3
Gardens—Labour and Upkeep :— ..		
Peradeniya Gardens	21,901	98
Hakgala Gardens	6,434	9
Henaratgoda Gardens ..	2,806	55
Nuwara Eliya Gardens ..	2,000	11
Queen's House Gardens ..	2,051	25
King's Pavilion Gardens ..	3,764	98
Queen's Cottage Gardens ..	5,748	21
Temple Trees Gardens ..	1,098	4
The Lodge Gardens	947	34
Cuddesdon Gardens ..	276	0
Nursery Work in Colombo ..	276	0
Experiment Stations :—		
Peradeniya	30,951	77
Jaffna	10,261	36
Anuradhapura	27,558	54
Chilaw Coconut Trial Ground ..	2,208	58
School and Home Gardens—Labour and Upkeep	14,064	3
Upkeep of library, laboratories, &c. ..	4,078	65
Prevention of plant pests and diseases ..	749	51
Incidental expenses	2,379	41
Agricultural Education :—		
Salaries	6,683	15
Scholarships	333	0
Travelling	—	
Lecturing fees	1,079	0
Incidental expenses	1,447	44
Rent of quarters	45	0
Laboratory expenses for School of Tropical Agriculture ..	300	19
Labour and upkeep, New Peradeniya Lands	2,944	29
Dieting of students	9,199	32
Co-operative Credit Societies :—		
Salaries	4,804	50
Travelling	1,086	59
Incidental expenses ..	161	62
Seed Store and Publication Depôt :—		
Salaries	3,360	0
Seed distribution	6,003	9
Publications	8,907	55
Incidental expenses ..	722	93
Special Expenditure :—		
Experimental cultivation of tobacco ..	4,639	35
Grants-in-aid for agricultural shows and competitions	3,938	95
Training of Secretaries, &c., for Co-operative Credit Societies ..	1,011	51
Experiments and demonstrations with paddy manuring, seed selection, &c.	4,188	64
Upkeep of additional minor experimental and demonstration plots ..	7,780	68
Cotton experiments	7,084	63
Equipment of entomological and school laboratories, Peradeniya ..	5,171	39
	495,641	70

This expenditure may be itemized under the following sub-heads :—

	Rs.	c.
Administration	31,248	77
Research : Scientific investigations, including Central Experiment Station	148,829	8
Botanic Gardens, including gardens of Governor's and Colonial Secretary's residences	81,928	78
Agricultural Education, including School of Tropical Agriculture, School Gardens, Grants to Shows, and Competitions ..	40,070	37
Divisional Experiments, including Special Expenditure on Tobacco Cultivation, Experimental Cultivation of Cotton, and Experiment Stations in Jaffna, Anuradhapura, and other experimental plots	167,506	91
Co-operative Credit Societies	7,064	22
Seed Store and Publication Depôt	18,993	57
	495,641	70

RECEIPTS.

71. The following is a statement of receipts for the financial year 1921–22 :—

		Rs.	c.
1.	Sale of seeds and publications	20,280	35
2.	Botanic Gardens, Peradeniya	2,607	51
3.	Botanic Gardens, Hakgala	777	18
4.	Botanic Gardens, Henaratgoda	63	30
5.	Botanic Gardens, Nuwara Eliya	52	75
6.	Experiment Station, Peradeniya	18,095	19
7.	Experiment Station, Anuradhapura	2,386	61
8.	Experiment Station, Jaffna	1,519	78
9.	Experiment Station, Trincomalee	73	42
10.	Experiment Station, Balangoda	59	22
11.	Experiment Station, Godakawala	190	71
12.	School of Tropical Agriculture	10,335	32
13.	Central Agricultural Division	281	60
14.	Southern Agricultural Division	86	23
		56,809	17

To this must be added the value of seeds and plants issued gratis to Government institutions from the following :—

	Rs.	c.
Peradeniya Gardens	2,426	40
Hakgala Gardens	629	35
Experiment Station, Peradeniya	320	80

72. These receipts show a satisfactory increase over the receipts of previous years. Special attention has been given during the year to the receipts of the Department, and it is satisfactory that the total amount collected has shown a satisfactory increase.

COMMUNIQUES.

73. The following *communiques* were made to the Press on matters of agricultural importance and interest during the year :—

Cotton at Ambalantota.
Paddy Competitions, Trincomalee District.
Budding of Rubber.
Kalutara School Garden Competition.
School Garden Competition, North-Western Province.
Cotton Cultivation.
Budding of Rubber in Ceylon.
Cotton Cultivation.
Water Hyacinth.

STAFF CHANGES.

74. It is with regret that I report the death on December 5, 1922, of Mr. N. Marshall, Divisional Agricultural Officer, Northern. Mr. Marshall performed good service in the Department, and devoted himself loyally to the duties of his office and laid the foundation of what must have been a career of considerable usefulness to the Colony. His loss is regretted by the whole Department and by all who came in contract with him.

75. The following staff changes took place during the year :—

(1) Mr. R. Aluwihare, C.C.S., was appointed to officiate in the post of Office Assistant to the Director of Agriculture, with effect from February 1, *vice* Mr. P. B. Herat.

(2) Mr. N. K. Jardine, Plant Pest Inspector (Central), who was away on leave in England, returned to the Island and resumed duties on February 24.

(3) Mr. G. G. Auchinleck, Divisional Agricultural Officer, who proceeded to Seychelles on special duty returned and resumed duties on April 15.

(4) Mr. F. P. Jepson, Assistant Entomologist, left for England on leave on May 17.

(5) Mr. G. Harbord, Acting Divisional Agricultural Officer, Central Division, left for England on leave on August 1, Mr. G. G. Auchinleck acting.

(6) Consequent on the appointment of Mr. T. H. Holland as Acting Divisional Agricultural Officer, Northern, on December 1 the following changes were made :—

Mr. H. A. Deutrom, Manager, Experiment Station, Anuradhapura, as Acting Manager, Experiment Station, Peradeniya.

Mr. V. Canagaratnam, Senior Agricultural Instructor, Batticaloa, as Acting Manager, Experiment Station, Anuradhapura.

Mr. C. Canagaratnam, Assistant Manager, Experiment Station, Anuradhapura, as Acting Senior Agricultural Instructor, Batticaloa.

76. The following appointments took place during the year in the Clerical, Agricultural, Research, and Field Staffs of the Department :—

Clerical.—Mr. B. D. Chandrasekera as Clerk, Head Office, from January 1, *vice* Mr. C. Duff-Tytler, appointed as Shorthand-Typist to the Department; Mr. W. M. Sirisena as Clerk, Head Office, from December 1, *vice* Mr. K. Paramanathan transferred to Land Settlement Department.

Agricultural Branch.—Mr. T. K. D. Samarasinghe as Vernacular Agricultural Instructor in bee-keeping; Mr. T. V. Thamotheram as Probationery Instructor in budding and grafting rubber, from March 1; Mr. C. A. Vaithilingam as Agricultural Instructor, Batticaloa South, from June 15; Mr. S. Sinnathurai as Agricultural Instructor, Kuruwita; Mr. F. A. Sandarasagara as Tamil Inspector, Co-operative Societies, from April 1, *vice* Mr. C. A. Muttukumaru deceased; Mr. E. S. de S. Jayasundera as Probationer from November 1.

Research Branch.—Mr. R. A. Cameron as Sub-Inspector, Plant Pests (Southern), from February 1; Mr. K. T. E. de Silva as Probationer from March 1, *vice* Mr. S. Thurairaja discontinued; Messrs. F. D. Peries and L. Abeysundera as Probationers from October 1 and November 1, respectively.

Field Branch.—Mr. P. B. Keppitipola as Assistant Foreman from August 1; Mr. E. A. Pieris as Assistant Foreman and Mr. M. D. S. S. Nanayakkara as Conductor from October 1.

77. The following transfers took place during the year in the Clerical, Agricultural, and Field Staffs of the Department :—

Clerical.—Mr. T. Chellappah as Clerk to Divisional Agricultural Office (Northern) and Mr. M. Rasiah as Clerk to the Superintendent of Botanic Gardens from May 1; Messrs. J. N. Culantaivalu from Kurunegala Kachcheri and P. W. E. Silva from Fiscal's Office, Negombo, were transferred to the Department with effect from November 1, *vice* Messrs. E. P. Chelliah and A. S. Samaraweera, respectively; Mr. K. Nagalingam from the Education Department was transferred to this Department from December 1, *vice* Mr. B. D. Schokman resigned; Mr. M. B. W. Palipana as Clerk to the Divisional Agricultural Officer (Central), Mr. M. D. H. Perera as Clerk to the Economic Botanist, and Mr. D. P. Jayatilleke as Clerk to the Manager, Experiment Station, Anuradhapura, from December 18.

Agricultural Branch.—Mr. J. C. Drieberg as Farm School Officer, and Mr. G. V. Wickramasekera as Assistant Farm School Officer, Peradeniya, with effect from January 1; Messrs. J. A. Alles and K. Arumugam as Agricultural Assistants to the Southern and North-Western Divisions, respectively, and Messrs. A. C. W. Jayawardene and G. Seneviratne as Agricultural Instructors, Chilaw and Maswela, from January 9; Mr. E. W. Dias Bandaranayaka as Senior Agricultural Instructor, Badulla, from February 14; Mr. V. Canagaratnam as Senior Agricultural Instructor, Batticaloa, Mr. N. Thambiah as Agricultural Instructor, Batticaloa South, and Mr. J. A. Rambukpota as Agricultural Instructor, Bibile, from March 1; Mr. Austin Abeysinghe, Agricultural Instructor, Ruanwella, to Kotmale range, and Mr. George Seneviratne, Kotmale to Ruanwella, from May 1; Mr. M. J. A. Karunanayake, Agricultural Instructor, Matara, was seconded for service in the Ceylon Spinning and Weaving Mills from August 1.

Field Branch.—Messrs. D. W. K. Goonewardene, Assistant Foreman, Peradeniya Gardens, as Nurseryman, Hakgala, and P. B. Kirindena, Nurseryman, Hakgala, as Upper Gardener, Peradeniya, from May 1; Mr. D. A. W. Ranasinghe, Foreman, Colombo Gardens, as Assistant Foreman, Henaratgoda Gardens, from September 1; A. D. Frederick as Upper Gardener, Queen's House, and A. D. Arnolis as Upper Gardener, Temple Trees, from November 1.

CONCLUSION.

78. I have to record my appreciation of the loyal support of, and the co-operation rendered by, all officers of the Department. Everyone has endeavoured to give of his best for the improvements of the agriculture of the Colony, and solid progress has been made in all branches.

April 4, 1923.

F. A. STOCKDALE,
Director of Agriculture.

Annexures.

I.—REPORT ON THE WORK OF THE DIVISION OF BOTANY AND MYCOLOGY.

MYCOLOGY.

MYCOLOGICAL specimens sent in for examination during the year numbered 548. Of these, 198 were tea, 88 Hevea, 118 fungi, chiefly from Hevea and tea, and 24 coconut. The remaining specimens included acacia, agave, alocasia, amherstia, apple, areca, asparagus, barleria, bauhinia, betel, bitter gourd, breadfruit, brinjal, cacao, canavalia, canna, ceara, cedrela, cinnamon, coffee, cotton, cyamopsis, dadap, dioscorea, eucalyptus, gliricidia, grevillea, guava, hibiseus, lime, mango, odontodenia, orange, paddy, papaw, paspalum, phaseolus, plantain, prickly pear, rose, sapodilla, sorghum, strobilanthes, sugarcane, *Swietenia macrophylla*, *Tephrosia candida*, tobacco, tomato, vanilla, violet.

Visits have been made by the staff to the Agrapatana, Ambegamuwa, Anuradhapura, Dimbula, Elpitiya, Hakgala, Haputale, Henaratgoda, Hewahetta, Kadugannawa, Kurunegala, Matale, Ratnapura, and Undugoda districts.

RUBBER.

The root disease of Hevea caused by *Xylaria Thwaitesii* has been under investigation, and experiments have been begun with *Fomes lucidus* as the probable cause of another root disease of this tree. One case was reported in which *Polyporus mesotalpæ*, which is known to cause root disease in tea, was associated with a Hevea. Mr. Bryce has investigated the action of acids and alkalies on the mycelium of *Fomes lignosus*.

TEA.

Numerous cases of *Cercosporella Theæ* on tea and acacias occurred during the south-west monsoon, and a lecture on this and other diseases of tea was given to the Dimbula Planters' Association. Black Rot, hitherto regarded as a low-country disease, was found at an elevation of nearly 6,000 feet. A comparison of the Ceylon Black Rot with specimens of *Corticium Theæ* from Java, kindly furnished by Dr. C. Bernard, Director of the Proefstation voor Thee, has shown that the Ceylon fungus is a different species. An examination has been made of Thread blights from Ceylon, India, the Federated Malay States, Java, Sumatra, West Africa, and the West Indies, and an account of these is ready for publication. Dr. C. Bernard has kindly provided specimens from Java and Sumatra, and Mr. R. H. Bunting specimens from West Africa. A leaf disease of tea, caused by *Phyllosticta Theæ*, hitherto known from the Caucasus, has been recorded. Investigations have been begun on a stem disease of tea, characterized by the death of shoots from pruned bushes, with the subsequent formation of clusters of shoots, or witches' brooms, from the same points, and another stem disease which causes an internal discoloration of the wood, only discoverable at pruning.

COCONUTS.

Mr. Bertus has continued his investigations on the gray blights of tea and coconut, and it would appear from his results that these are two different diseases.

Investigation of the nut fall of coconuts, and the effect of spraying, has been continued. The nut fall, in great part, appears to be due to physiological causes, and Mr. Gadd, who is carrying out the the work on this subject, has written a bulletin on this question. On one estate, where coconuts in tea were felled, Brown root disease (*Fomes lamaoensis*) developed on the coconut stumps and spread from them to the tea.

PLANTAINS.

Investigation of the Bunchy top disease of plantains has been continued by Mr. Bryce, who has isolated several fungi from diseased plants. Infection experiments with these fungi have been planned.

Miscellaneous.

Work on the Ceylon species of phytophthora on Hevea, cacao, papaw, &c., has been continued by Mr. Gadd.

Mr. Ragunathan has completed his investigation on the teleutospores of *Hemileia vastatrix*, and has prepared a paper which is now in the Press. He has since begun investigations of the diseases of betel and vanilla.

BOTANY.

476 specimens of flowering plants have been sent in for identification. Many of these were weeds from estates where clean weeding had been stopped. In all cases these were well-known Ceylon weeds, generally native plants. Among the chief of these were *Drymaria cordata* Willd., *Cardamine subumbellata* Hk. f., and the grass-like fern, *Schizæa digitata* Sw.

Collecting trips were made by the Assistant in Systematic Botany, Mr. Livera, and the Plant Collector, in the Batticaloa, Nuwara Eliya, Kalutara, Dimbula, Kurunegala, Hambantota, and Henaratgoda districts.

Mr. Livera has begun an examination of the fruits of the mangosteen, to determine the distribution of the resin canals, in connection with the "gamboge disease" of this fruit.

A report was furnished on the subject of Ceylon Gamboge.

Messrs. Bryce and Gadd have carried out an investigation of the structure of the bark of the descendants of the Henaratgoda Hevea No. 2 in relation to yield, and have dealt with the results by modern statistical methods. Mr. Gadd has also afforded assistance in statistical work to other divisions of the Department.

PUBLICATIONS.

One number of the Annals of the Royal Botanic Gardens has been published during the year, containing papers entitled "Additions to Ceylon Fungi, II.," and "Interim Notes on Entomogenous Fungi," and miscellaneous botanical notes of local interest. Another number of the Annals is in the Press.

Other publications which have appeared during the year, written by the staff of this division are—

Nut Fall of Coconuts, by C. H. Gadd, Bulletin No. 53.
Improvement of Yield in Hevea by the Selection of Seed Bearers, by G. Bryce and C. H. Gadd, Bulletin No. 55.
The Effect of Manures on the Shot-hole Borer of Tea, by C. H. Gadd and F. P. Jepson, Bulletin No. 56.

T. PETCH,
Botanist and Mycologist.

February 2, 1923.

II.—REPORT ON THE WORK OF THE ENTOMOLOGICAL DIVISION.

REPORT OF THE ENTOMOLOGIST.

Consignments of specimens received during the year numbered 201, and include insect pests from all the more important crops and from miscellaneous plants.

During 1922 the Entomologist visited estates in the following districts:—Dumbara, Rattota, Ukuwela, Ramboda, Badulla, and Passara.

Two visits were paid to the Batticaloa District of the Eastern Province: one in February–March to investigate the coconut caterpillar and its parasites, and the other in October to inspect the coconut areas in that district, with special reference to the control work against the three main pests of this crop. A visit was paid to the Southern Province in November to investigate an outbreak of the semi-looper caterpillar on cotton.

Fumigatorium.

During the year 52 cases of tea seed, 307 cases of oranges, and 322 packages of plants and seeds were treated at the fumigatorium in Colombo. The importation of tea seed, directly or indirectly, from any place in India was prohibited from June 30.

The Entomologist paid one visit to the fumigatorium during the period under review.

Pests in 1922.

Tea.

Shot-hole borer (*Xyleborus fornicatus*).—The investigations on this pest have been continued by the Assistant Entomologist and by the Acting Assistant Entomologist, after the former went on leave. A report of these investigations is given below.

Tea tortrix (*Homona coffearia*) continues to be prevalent in certain districts, but very few attempts have been made to establish "flight breaks." Until this is done the spraying of infested areas with the lead chromate and rosin compound mixture cannot be carried out.

Towards the end of July the appearance of an unusual caterpillar was reported from two adjoining estates in the Ramboda district. The caterpillars usually web together some of the leaves to form a sort of "nest," within which they shelter and feed on portions of the leaf surface. The attacked leaves wither and die, and new leaves are included as required. Spiders were also found to be present on many of the affected bushes, which were covered with their webbing.

This same caterpillar has been found recently on estates in the Badulla District. An article on this pest, which has been provisionally named the Tea Pyralid will appear in the yearbook of the Department.

The "fringed nettle grub" (*Natada nararia*) has been prevalent on a few estates in Uva, and is the subject of a special article in the same yearbook.

Among other caterpillar pests which have occurred during the year may be mentioned the "bagworms" *Acanthopsyche hypoleuca*, *Clania variegata*, and *Chalia doubledayi*, and the red slug (*Heterusia cingala*).

The tea termites (*Calotermes* spp.) do not appear to have been quite so prevalent as formerly, except in one or two up-country districts, but the smaller scavenging termites (*Termes obscuriceps*, *T. redemanni*, and others), which feed mainly on dead bark and wood, appear to be on the increase in most tea districts at various elevations. Fuller reference will be made to these pests in the yearbook, and a leaflet is in course of preparation.

Helopeltis has been prevalent in small patches on several estates, and is usually an indication of lack of vigour in the bushes.

Rubber.

Only a few reports of pests of Hevea rubber have been received during 1922. The stem and root borer (*Batocera rubus*) causes a certain amount of damage, and occasionally kills young trees.

The brown bug (*Saissetia hemisphærica*), accompanied by the sooty mould, is occasionally prevalent on the leaves of rubber trees growing under poor conditions.

Coconuts.

The investigation of coconut pests has been continued during the year, and information has been issued on the subject (see publications). A review of the more important pests of coconut will appear in the yearbook.

Rice.

An outbreak of a small leaf-hopper or plant-bug (*Niloparvata greeni*) was reported during the year from one district, and the swarming caterpillar (*Spodoptera mauritia*) was reported from two districts. The plant-bug (*Podops scutellata*) also occurred, while the stem-borer (*Schœnobius incertellus*) and the paddy fly (*Leptocorisa varicornis*) were prevalent.

Cotton.

The semi-looper caterpillar *Anomis* (*Cosmophila*) *erosa* was prevalent on the leaves of young cotton plants during November in a part of the Southern Province, and was controlled by hand picking the caterpillars, by the application of Paris Green both in the dry and liquid form, and by the removal, as far as possible, of the alternate host plants of the pest. The favourite host plant was the Malvaceous weed (*Abutilon graveolens*), and at least two other weeds, *Acalypha indica* (Euphorbiaceæ) and *Achyrantes aspera* (Amarantaceæ), were freely attacked by the caterpillars. The boll-worm (*Earias fabia*) and the leaf-roller (*Sylepta derogata*) also occurred in smaller numbers on the same plot. The pink boll-worm (*Platyedra gossypiella*), the red bug (*Dysdercus cingulatus*), and the black scale (*Saissetia nigra*) have been reported from the other localities.

Miscellaneous Pests.

A number of specimens have been received or collected during the year from plants of economic importance, among which may be mentioned the following:—The plantain weevil (*Odoiporus longicollis*), the toona borer (*Hypsipyla robusta*), the shoot-borer (*Terastia meticulosalis*), the leaf-eating caterpillars (*Suana concolor* and *Taragama dorsalis*), Pentatomid bug (*Cyclopelta siccifolia*), a mealy bug (*Pseudococus* sp.), and the spotted locust (*Aularches miliaris*), all on dadap (*Erythrina* spp.); the scale insect (*Ceroplastodes cajani*) on *Boga medeloa* (*Tephrosia candida*); the bark-eating borer (*Arbela quadrinotata*) and a bagworm (*Acanthopsyche* sp.) on albizzia.

LEGISLATION.

The fluted scale (*Icerya purchasi*) was declared to be no longer a pest under the Insect Pest and Quarantine Ordinance, No. 5 of 1901 (see *Government Gazette*, No. 7,300 of December 8, 1922).

PUBLICATIONS.

The following publications have been prepared by the staff of this division during the year:—

The Coconut Caterpillar, by J. C. Hutson, Leaflet No. 20.
The Rhinoceros or Black Beetle, by J. C. Hutson, Leaflet No. 21.
The Red Weevil or Palm Weevil, by J. C. Hutson, Leaflet No. 22.
Some Preliminary Notes on the Coconut Caterpillar in Ceylon, by J. C. Hutson, Bulletin No. 58.
The Treatment of Buried Prunings on Shot-hole Borer Infested Estates, by F. P. Jepson, Bulletin No. 54.
The Effect of Manures on the Shot-hole Borer of Tea, by C. H. Gadd and F. P. Jepson, Bulletin No. 56.
A Preliminary Report on Paddy Fly Investigations, by G. D. Austin, Bulletin No. 59.

The following entomological publication has also been issued during the year:—Shot-hole Borer of Tea: Damage caused to the Tea Bush, by E. R. Speyer (formerly Entomologist for Shot-hole Borer Investigations), Bulletin No. 60.

J. C. HUTSON,
Entomologist.

January, 1923.

REPORT OF THE ACTING ASSISTANT ENTOMOLOGIST, 1922.

Since the departure on leave on May 15 of Mr. Jepson, the Inspector for Plant Pests and Diseases, Central, has acted as Assistant Entomologist in addition to his own duties.

Shot-hole Borer Pest of Tea.

Manurial Experiments.—Most of the period under review has been devoted to the examination of, and calculations in connection with, the two series of general mixture experiments being carried out on Sarnia estate, Badulla. These experiments have been examined on two occasions: first, in June, occupying ten days; and secondly, in September, occupying twenty-five days. Data have been collected and held over for comparison with the figures to be obtained at a third examination to be made early in 1923.

Endeavours to procure an area of tea that has not previously been manured, and with a two-year pruning interval, near to the headquarters, for a further series of experiments with individual manures, have so far been unsuccessful.

Castor Experiments.—Examinations of the castor experiments of Sarnia have been made on two occasions. Visits have also been made to the Hunasgeriya and Bellwood castor plots. The seed of these latter plots is of the same stock as planted at Sarnia, but towards the middle of the year it was found the majority of the Hunasgeriya and Bellwood plants had died during the dry weather. Seed was then collected from the Sarnia castor and planted in the plots of these two estates. The plants are developing favourably though vacancies have to be constantly filled.

Castor has also been planted at Peradeniya for the purpose of getting stock for a series of experiments at headquarters to ascertain the relative attraction of *Xyleborus fornicatus* to tea and castor respectively.

Office.—The Shot-hole borer type and other collections have been re-arranged, data correlated, and kept on the card index system. A bibliography has been completed and kept up to date on the same system. Specimens have been submitted to the Bureau of Economic Entomology for determination.

NIGEL K. JARDINE,
Acting Assistant Entomologist.

January, 1923.

III.—DIVISION OF PLANT PESTS AND DISEASES INSPECTION.

CENTRAL.

Circuit.

Circuits during the year have been made in the Central Province, Badulla, Passara, Madulsima, and Lunugala, and are as follows:—

N. K. Jardine	50 days
J. Jackson	66 days
B. A. Pereira	121 days
M. R. M. Jebaratnam	176 days

Inspection of Estates and Gardens.

Greater attention has been paid during the year to estates than to gardens, on the point of economy, for statistics of the office for 1921 show that the cost of inspecting 1,000 acres of gardens was Rs. 2,930, as against Rs. 25 for 1,000 acres of estates.

During the year 183 estates totalling 83,800 acres have been inspected, and 115 gardens totalling 528 acres and 6 nurseries.

Plant Pests and Diseases Legislation.

In accordance with the regulations made under Ordinance No. 5 of 1901, 44 estates and 124 gardens have been scheduled as being infested by shot-hole borer (*Xyleborus fornicatus*), and 11 estates by fluted scale (*Icerya purchasi*). Twenty-five estates have been removed from the schedule as no longer possessing fluted scale.

All estates infested with fluted scale were circularized, with a view to ascertaining whether it was the general opinion that this insect was no longer a serious pest, and should be removed from the schedule of pests. The replies were considered by the Department of Agriculture, and the whole matter was submitted to the Estates Products Committee of the Board of Agriculture. It was recommended that *Icerya purchasi* could no longer be considered a pest within the meaning of the Ordinance, and it has consequently been removed from the schedule.

Permits for the Sale of Plants.

The number of plants sold on permits during the year numbered 2,536,650. These plants were covered by 150 permits.

General.

The inspection of the tea-growing area of Central Province and Uva, with the exception of Badulla, has been completed. The inspection of Badulla will be completed in February, 1923. Attention is now being given to rubber and other crops of the Central Province.

INSECT PESTS RECORDED.

The following insect pests have been recorded during the year in the course of inspection of estates and gardens :—

TEA : —

ACARINA :—
Yellow mite (*Tarsonymus translucens*).
Red spider (*Tetranychus bioculatus*).
Scarlet mite (*Brevipalpus obovatus*).

COLEOPTERA :—
Shot-hole borer (*Xyleborus fornicatus*).

DIPTERA :—
Tea leaf miner (*Oscinis theæ*).

HEMIPTERA :—
Tea aphis (*Ceylonia theacola*).
Tea mosquito (*Helopeltis antonii*).
Tea bark louse (*Aspidiotus camelliæ*).
Green bug (*Coccus viridis*).
Brown bug (*Saissetia hemisphærica*).
Black bug (*Saisseta nigra*).
White tea louse (*Chionaspis theæ*).

ISOPTERA :—
White ants (*Eutermes* sp.).
White ants (*Calotermes militaris*).

LEPIDOPTERA :—
Red borer (*Zeuzera coffeæ*).
Blue striped nettle grub (*Parasa lepida*).
Green striped nettle grub (*Thosea cana*).
Fringed nettle grub (*Natada narraria*).
Cut or black worm (*Agrotis ypsilon*).
Lobster caterpillar (*Stauropus alternus*).
Small bag worm (*Psyche albipes*).
Spiral faggot worm (*Clania holmesi*).
Tea tortrix (*Homona coffearia*).
Tea leaf roller (*Gracilaria theivora*).
Red slug (*Heterusia cingala*).

ACACIA sp. :—
Fluted scale (*Icerya purchasi*).

ALBIZZIA sp :—
Tea tortrix (*Homona coffearia*).

CEDRELLA TOONA :—
Toona shoot borer (*Hypsipyla robusta*).

COCOS NUCIFERA :—
Red weevil (*Rhynchophorus ferrugineus*).
Rhinocerus beetle (*Orcytes rhinocerus*).
Black-headed caterpillar (*Nephantis serinopa*).

EUCALYPTUS ROBUSTA :—
Tea tortrix (*Homona coffearia*).

ERYTHRINA LITHOSPERMA :—
Dadap stem borer (*Terastia meticulosalis*).
Dadap caterpillar (*Taragama dorsalis*).

GREVILLIA ROBUSTA :—
Shot-hole borer (*Xyleborus fornicatus*).
Tea tortrix (*Homona coffearia*).

HEVEA BRASILIENSIS :—
White ants (*Calotermes* sp.).

HIBISCUS ESCULENTUS :—
Leaf-eating grub (*Cosmophila orosa*).

LITSEA ZEYLANICA :—
Shot-hole sp. (*Xyleborus* sp.).

ROSA VARS :—
Egyptian cushion sale (*Icerya ægyptiacum*).
Tea tortrix (*Homona coffearia*).

THEOBROMA CACAO :—
Bark borer (*Arabela quadrinotata*).

MISCELLANEOUS :—
Kalutara snail (*Achatina fulica*) on cacao and garden plants. Hares destroying shoots of tea in new clearings. Pigs and porcupines barking tea. Pigs stripping bark from tapping surface of rubber. Squirrels and rats destroying cacao pods. Rats and hares destroying paddy.

DISEASES RECORDED.

The following diseases have been recorded during the year in the course of inspection of estates and gardens :—

ACACIA :—
Armillaria fussipes.

COCONUT :—
Fomes lucidus.
Phytophthora (nut fall).

COFFEE :—
Hemileia vastatrix.

GREVILLEA :—
Loranthus.

PLANTAINS :—
Bunchy top : Leaf droop.

RUBBER :—
Botryodiplodia.
Brown bast.
Bark rot.
Corticum salmoni.
Fomes lamaœnsis.
Hymenochæte noxia.
Phytophthora faberi.
Sphærella heveæ.

TEA :—
Aglospora aculeata.
Botryodiplodia theobromæ.
Cercosporella.
Cephaleurus mycoidea.
Hymenochæte noxia.
Massaria theacola.
Phoria hypoleteritia.
Ustulina zonata.

NIGEL K. JARDINE,
Inspector for Plant Pests and Diseases (Central).

January 4, 1923.

SOUTHERN.

INSPECTION OF ESTATES AND GARDENS.

An effort was made to concentrate on tea estates, so that a proper shot-hole borer schedule could be furnished for the low-country. The following districts have been finished as regards shot-hole borer inspection of estates, viz., Rakwana, Morowak korale, Galle, and Kalutara. Kelani Valley and Ratnapura are practically finished.

For the twelve months 176 estates covering over 90,000 acres and 95 gardens have been inspected and 61 estates and 28 gardens have been scheduled as infested with shot-hole borer.

Water Hyacinth Eradication.

One sub-inspector was present in the Tangalla district on this work for four and a half months. Twenty tanks and the waterways in the adjoining paddy fields were clean weeded, and also about 6 miles of the Urubokka-oya. The weed is again appearing in the oya, more especially in backwaters, and a few seedlings are present in some of the tanks. The work appears to have been done very thoroughly and with care, the weed should not, even in the oya, cause much more trouble if systematic weeding is carried on.

Pests and Diseases.

The total number of specimens received at this office has been 51, consisting of various pests and diseases, mainly of rubber and tea.

In addition to the common pests and diseases attacking tea and rubber, the following new ones were recorded :—

Tea :—

Eutermes sp.
Calotermes greenii.
Euschema palmyra.
Achatina fulica (African snail).

Rubber :—

Daldinia concentrica (as a wound parasite).

Collections of low-country termites found in tea fields were sent to the Entomologist. Termites seem to be much the most dangerous pest of tea in the low-country.

Of root diseases in rubber, *Ustulina zonata* still appears to be the commonest, though *Fomes lignosus* still gives trouble on some estates. Cases of brown root disease frequently appear, but poria is apparently uncommon.

Phytophthora diseases have been exceptionally prevalent this year owing to the wet season.

The most noticeable thing in tea diseases has been the gradual disappearance of red rust (*Cephaleuros parasitica*) with a return to normal cultivation and manurial programmes.

Black rot (*Corticium theæ*) has given trouble on some estates during the wet weather, and branch canker is also very prevalent.

Of root diseases, the most troublesome appears to be diplodia, although ustulina and poria are very common.

Tea tortrix (*Homona coffearia*) was found on most estates, but not as a serious pest.

Shot-hole borer (*Xyleborus fornicatus*) is on the decrease in the low-country. On estates which previously reported that the frames of their tea bushes were riddled with this pest now only occasional branches are found to be infested.

A. T. REEVE,
January 26, 1923. Inspector for Plant Pests and Diseases (Southern).

IV.—REPORT OF THE GOVERNMENT CHEMIST.

The laboratory work during the year included analyses of the following materials :—Sugar cane, fodder grasses, green manures, rubber, tea soils, manures, limestones, tea leaves, hevea bark and leaves, old coconut leaves, acacia barks, camphor, snails, brunolinum, lime juice, and vinegar. The total number of analyses was 164.

Several letters were received and advice given *re* liming tea and manuring tropical products generally.

Two visits were made to the new Paper Factory at Moratuwa, and advice given *re* the strengthening of the paper and duplication of the plant. The cost of raw materials used has risen, and a much larger output is required to insure a fair return on the capital outlay.

Soils.

An investigation into the chemical composition and physical properties of the paddy soils of Ceylon and other tropical countries was carried out in Colombo, and a report on the same was prepared by Mr. Bruce, and the opinions expressed are his own.

Investigations into the chemical composition and physical properties of forest soils were also made.

Green Manures.

These included loppings of *Gliricidia Maculata* and *Erythrina lithosperma* (Dadap) as used on tea estates ; also *Nilloo.*

Gliricidia contained 0·43 per cent. nitrogen on the fresh material, or 1·79 per cent. on the sun-dried material. The ash was chiefly rich in lime and potash, phosphoric acid being low. One ton of the fresh loppings contains approximately 450 lb. of organic matter, including nitrogen 8·62 lb., and 49·4 lb. of ash containing potash 14·10 lb., lime 13·20 lb., and phosphoric acid 1·56 lb.

Dadap loppings contained more moisture than Gliricidia, and 0·39 per cent. nitrogen on the fresh and 3·09 per cent. on the sun-dried material. The ash contained rather more potash and phosphoric acid and less lime than Gliricidia. One ton of fresh loppings of Dadap contains approximately 234 lb. organic matter, including nitrogen 8·70 lb., and 24·8 lb. of ash containing potash 7·40 lb., lime 5·38 lb. and phosphoric acid 2·02 lb.

The *Nilloo* from Undugoda estate contained 0·41 per cent. of nitrogen on the material as received, which contained only 59·10 per cent. of moisture. The ash was richer in lime, but poorer in potash and phosphoric acid than the Gliricidia or Dadap loppings.

One ton of the fresh material would supply about 740 lb. of organic matter containing 9·15 lb. of nitrogen, and 176 lb. of ash containing lime 67 lb., potash 16·1 lb. and phosphoric acid 2·45 lb.

RUBBER LEAVES.

The analysis of fallen rubber leaves, which is practically the only organic matter that can be returned to the soil on mature rubber estates, shows the material to be very poor in nitrogen, 0·08 per cent. One ton of the leaves would contain about 1·78 lb. of nitrogen and 124 lb. of ash.

FODDERS.

Fodder grasses analysed for their food value included *Paspalum Virgatum* and *P. dilatatium*, Guinea grass A and B, water grass, and Rhodes grass (*Chloris Gayana*).

The composition varied to some extent, the poorest grass in food units being Rhodes grass with 60·1, and the richest Guinea grass B and *Paspalum dilatatum* with 74·55 and 74·03 respectively.

The proteid content varied from 5·6 per cent. in water grass to 13·56 per cent. in Guinea grass B.

The following table shows the chief constituents affecting the food value :—

	Paspalum Virgatum.	Paspalum Dilatatum.	Guinea Grass A.	Guinea Grass B.	Rhodes Grass.	Water Grass.
Carbohydrates	36·90	47·63	31·82	34·75	39·60	47·20
Proteids	9·40	7·83	9·25	13·56	6·90	5·60
Ether extract	1·90	2·68	4·88	2·36	1·30	1·30
Food units	65·20	74·03	67·15	74·55	60·10	64·50
Albuminoid ratio	1 : 4·2	1 : 1·3	1 : 4·2	1 : 6	1 : 6·7	1 : 9

TEA.

In view of the finer or more careful plucking resorted to on tea estates during 1922, flushes of three and two leaves and a bud representing high, medium and china jat bushes from three up-country estates were examined to determine the loss of crop from finer plucking. They also represented bushes at different ages from pruning.

The difference in the average weight of 1,000 shoots from different jat bushes, taken from one field was considerable.

1,000 fresh shoots, three leaves, and a bud from high jat bushes, weighed 4·70 lb., from medium jat bushes 2·65 lb., and from small jat bushes 1·53 lb.

The weight of the third leaf on all jats was about 43 per cent. of the total weight of the flush ; and the stalk, which is usually thrown away when three leaves and a bud are plucked, amounted to 15·2 per cent. of large flushes and 9·52 per cent. of smaller flushes.

The figures show that the loss in weight of flush by plucking two leaves and a bud, instead of three leaves and a bud, and throwing away the stalk between the second and third leaves, amounts to 34·81 per cent.

A crop of 900 lb. per acre would, therefore, be reduced to 586 lb. per acre.

The average percentage composition of large and small three-leaf flushes is :—

	Large Flushes. Per Cent.	Medium and Small Flushes. Per Cent.
Coarse stalk	15·10	9·52
Third leaf	43·62	43·00
Second leaf	23·49	16·70
First leaf	8·38	7·15
Bud	4·36	4·78
Stalk	5·03	19·10

The difference in the percentage composition of two leaves and a bud from large and small flushes is marked, and must considerably affect the proportion of fine leaf and grade :—

	High Jat Shoots. Per Cent.	Medium and Low Jat Shoots. Per Cent.
Second leaf	57·00	35·00
First leaf	20·40	15·01
Bud	10·60	10·00
Stalk	12·20	40·00
	100·00	100·00

The proportion of stalk in the medium and low jat bushes appears abnormally high, and differs from that found on other estates, where it equalled 10·4 per cent., 14·8 per cent., and 28·2 per cent. for somewhat similar jats.

The percentage of moisture in the different parts of the shoots varied from 85·10 per cent. in the stalks to 69·40 per cent. in the buds, the third, second, and first leaves containing 78·5 per cent., 78·25 per cent., and 74·10 per cent. respectively.

There was little difference to note between the ash of two leaves and a bud, 5·20 per cent., and the third leaf 5·13 per cent., but the percentage was rather higher in the good jat tea, viz., 5·70 per cent.

The average ash content for the leaf from three different estates was 5·47 per cent., 4·99 per cent., and 4·91 per cent.

The total extract from two leaves and a bud and the third leaf was :—

	Two Leaves and Bud. Per Cent.	Third Leaf. Per Cent.	Difference. Per Cent.
Poor jat	41·60	37·50	4·10
Good jat	40·50	36·90	3·60
China jat	38·50	35·70	2·80
Medium jat	41·40	39·40	2·00

In one instance of good jat flush the third leaf gave a larger total extract than the two leaves and a bud.

The difference in the number of flushes from poor, medium, and high jat flushes that have to be plucked to make one pound of dry tea is as follows :—

	Three Leaves and a Bud. Flushes.	Two Leaves and a Bud. Flushes.
Elevation 4,500 :—		
High jat tea	850	2,360
Medium jat	1,520	5,220
Small jat	2,680	
Elevation 5,200 :—		
Good medium jat	1,440	3,400
Elevation 5,600 :—		
Medium jat	3,540	5,120
China jat	7,120	12,280

Dolomitic Limes.

Owing to the high cost of transport of coral lime, and the poor way in which it is generally burned in Ceylon, the question of utilizing local outcrops of limestone for agricultural purposes has been investigated. Such limestones outcrop in several districts in Ceylon and analyses show that they are largely dolomitic, *i.e.*, containing a varying percentage of magnesia. These limes have been burned locally, where fuel is generally cheaper and better than on the coast, where coral lime is usually burned. They have now been used for treating tea soil in the Uva District for some years with success.

The composition of pure dolomite is approximately 54·3 per cent. carbonate of lime and 45·7 per cent. carbonate of magnesia, or a ratio 1 : 0·84.

The composition of the dolomitic limestones in the tea districts of Ceylon varies, but the ratio of lime to magnesia is usually higher than that of pure dolomite. The average ratio of lime to magnesia from six widely distant districts was as 1 : 0·6.

One sample from an outcrop near Matale was as 1 : 0·8, or practically pure dolomite, while another from Kurunegala District had a ratio of 1 : 0·127, and was well suited for agricultural purposes.

The percentage of lime and magnesia in typical samples of the rock are as follows :—

	Hakgala. Per Cent.	Passara. Per Cent.	Lunugala. Per Cent.	Lunugala. Per Cent.	Badulla. Per Cent.	Dikwela. Per Cent.	Matale. Per Cent.	England. Per Cent.
Lime (CaO.) ..	34·0	45·0	39·0	34·0	43·0	35·0	33·5	33·10
Magnesia (MgO.) ..	17·6	27·5	23·4	20·5	24·5	14·4	21·8	19·04

For many years it has been thought that dolomitic limestone was unsuitable for agricultural purposes, but it has been used in England with success on soils poor in magnesia. Voeleker has shown that magnesia has a stimulating effect on feeding-root development. It has also been shown by Wilstatter that chlorophyll is a magnesian compound, and that magnesia is necessary for the formation of oil. It is also stated that plants deficient in a supply of magnesium do not form new cells readily. Magnesium silicate applied to wheat up to 4 tons per acre in 1920 has been found to increase the corn by 13·5 per cent. and 35·4 per cent. straw the first year, and by 72 per cent. and 39 per cent. the second year without further application.

From the results of actual experience in Ceylon and in England, on sour soils with the use of dolomitic limestone, it would appear therefore that Ceylon dolomitic limestones, either burned or finely ground, can safely be applied to tea in quantities of 4 to 5 cwt. per acre every two of three years.

Acidity of Soils.

With regard to the question of the necessity or otherwise of neutralizing the acid or sour character of most Ceylon tea soils, samples of soil from fields yielding the largest quantity of high quality tea per acre were obtained and fully analysed, especially with regard to the presence of available iron compounds and the acidity or sourness.

Two soils from the Kandapola district at 6,300 feet elevation giving an average yield over ten years of 751 lb. and 814 lb. per acre showed a marked acid reaction, also the presence of much lower oxide of iron.

The soils are both rich in humus and nitrogen, also potash and phosphoric acid. Lime and magnesia are also above the average for Ceylon soils, but the reaction is still acid. The available potash and phosphoric acid is fairly good, and rather more in the soil giving the larger yield than in the other which had more nitrogen.

Another soil and sub-soil from the Haputale district at an elevation of about 6,000 feet was taken from a heavily manured field giving an average yield over seven years of 1,211 lb. per acre, the maximum in any one year being 1,705 lb.

The soil is a dark-coloured, rich-looking free loam rich in humus and nitrogen, also potash and phosphoric acid, the available potash and phosphoric acid being much above the normal. The reaction is markedly acid, and there is much of the lower oxide of iron present.

The sub-soil is richer than the surface soil of many up-country estates, and shows the same marked acidity and presence of lower oxide of iron.

Another heavy yielding soil from an estate at 6,600 feet giving a high quality tea was also analysed. The field is planted with medium jat tea several years old, and yielded 1,021 lb. per acre in 1913–14 and 1,143 lb. per acre in 1916–17, that is at the same age from pruning. Comparatively light manuring has been done.

The soil is a friable brown loam fairly rich in humus and nitrogen, but considerably below the other soils analysed. It is fairly rich in potash and phosphoric acid, but the available potash is very low, while the available phosphoric acid is fairly good.

The soil reaction is markedly acid, and there is much of the lower oxide of iron present.

These typical soils all show a marked acidity, and in no case has it been necessary to attempt to neutralize this to maintain the high yields.

MOISTURE IN SOILS.

Towards the end of the severe drought which occurred in Uva during the present south-west monsoon, samples of soil and sub-soil were taken from areas where the tea had wilted and dropped all its leaves, and from where the bushes continued to look well but flush had ceased. The moisture was estimated in the soils to determine the minimum quantity necessary for the maintenance of healthy growth.

Samples were taken of the surface soil to 6-inch depth, and from 6-inch to 12-inch for the sub-soil.

	Tea Wilted and Leafless. Per Cent. Water.	Tea Green and Healthy. Per Cent.
Top 6 inches	7·05 ..	12·15
Lower 6 inches	10·70 ..	14·95

Although there was 7·05 per cent. of moisture present in the surface soil, this was unavailable, and could not be absorbed by the plant roots, and it would appear that about 5 per cent. above this amount is required to prevent wilting, and an excess over 12 per cent. in the surface soil to permit of active growth and formation of flush.

The importance of increasing the organic matter or humus in the soil is apparent.

MISCELLANEOUS

A sample of the leaves and twigs of *Gaultheria Procumbens*, which grows in certain areas on the patnas at 5,000 feet to 6,000 feet, was collected in February by the Superintendent of the Hakgala Gardens for the estimation of thymol.

The leaves on air drying lost 70·3 per cent. of moisture, and no oil was obtained on distillation. The leaves smell fairly strong at certain periods of the year, and a further distillation will be made with leaves collected at the end of the active growing period and before the south-west monsoon in June.

The manurial value of snails was estimated, but it was found that they were not sufficiently rich in plant food to pay for cartage and application. The snails varied considerably in size, from 1½ to 5 inches long, and from 22 to 115 grammes in weight. About 27,000 of the snails of all sizes go to the ton. The ton would contain 492 lb. of dry shell, chiefly carbonate of lime, also 252 lb. of dry snail flesh containing 18 lb. of nitrogen, 89 lb. of lime, 22 lb. of phosphoric acid, and 10·4 lb. of potash.

A sample of Phosphate de Kosseir (Egypt) was analysed and found to contain 30·72 per cent. phosphoric acid equal to 67·4 per cent. of calcic phosphate. About 7 per cent. of phosphoric acid was soluble in 2 per cent. citric acid. The phosphate required finer grinding.

A sample of fish scales received from the Divisional Agricultural Officer, Southern Division, contained 5·28 per cent. nitrogen and 20·0 per cent. phosphoric acid. They are difficult to grind, and would be very slow acting if applied in their present form.

Samples of locally made vinegar from cane juice and coconut toddy vinegar were compared. The former contained only 2·74 per cent. acetic acid, against 4·15 per cent. in the latter. It also contained 10·05 per cent. of solids, of which over 1 per cent. was sugar. It was turbid, and grew a white mould on standing. The total solids in the toddy vinegar was only 1·92 per cent., and the vinegar was a clear brown with a pleasant aroma.

The plant *Ocymum Sanctum* the Sacred Basil (Sinhalese, maduru tala), grows freely as a weed in the sandy coconut soils of Chilaw, and is employed by the Sinhalese to drive off mosquitoes by hanging up or burning in their houses. The plants on sun-drying lost 66·8 per cent. of moisture, and were then distilled, yielding 0·456 per cent. of a pure greenish oil. Specific gravity 0·910 at 29°C. The oil became turbid with 1 to 3 cc. of 80 per cent. alcohol, and oily drops separate on increasing the alcohol to 9 cc. According to Schimmel, the oil is distilled in the south of France, Spain, and Germany from the fresh herb, the yield being 0·02 to 0·04 per cent., which is much below the yield from the air-dried Ceylon Basil. The French and German oil has a specific gravity from 0·905 to 0·930, and is soluble in 1 to 2 parts of 80 per cent. alcohol. Reunion oil has a camphor-like odour and specific gravity 0·945 to 0·987. It is soluble in 7 parts of 80 per cent. alcohol. Further investigation as to this oil and the possible yield under cultivation is desirable. Also to compare it with the oil distilled in Reunion and Java from *Ocymum basilicium* which is used for the preparation of mignonette extract.

M. KELWAY BAMBER,
Government Agricultural Chemist.

February 23, 1923.

V.—REPORT OF THE DIVISION OF ECONOMIC BOTANY.

POLICY AND EXPANSION.

FOR paddy the policy enunciated for last year has been adhered to, and the work on the longer-aged ma-wi and samba paddies has reached the stage of repetition for consistency of records. The yala paddies need still further attention, but they have been brought to the standard test explained for the maha season, 1921–22, in the last report. This year, and for future trials, the outer row of plants has been deleted, and the standard plot measures 4 feet by 40 feet at Anuradhapura, and 4 feet by 20 feet at Peradeniya. At the latter station the fields are too small to allow sufficient repetitions of the larger plots.

The need for suitable storage of grain has been realized, and sanction has been obtained for the erection of a seed store and field laboratory at the Anuradhapura Station.

A scheme of development was submitted to the Director in June, which was accepted in so far as finances would allow. From this two important divisions of the work have arisen. In the first place, it has hitherto been found impossible to carry out the proposals in Sessional Paper I. of 1918 for seed stations in several parts of the Island. As a *quasi* alternative, selected seed was distributed through the Divisional Officers to certain Agricultural Instructors for trial in eight districts. Only six of these Instructors were able to utilize the seed, but these plots will serve as valuable indications of the merit of the selected seed in their new environment. The scheme will be expanded.

Secondly, an acre of land on the Peradeniya Experiment Station has been cleared, and is now under cultivation, as a trial ground for vegetables and other food crops for selection work on lines similar to those laid down for paddy. Attention is at present confined to varieties of kurakkans, chillies, brinjals, snake-gourds, and cowpeas; and French and Lima beans are to be included. Seed has been obtained from various parts of the Island through the Agricultural Instructors and headmen, and a large collection of varieties of chillies has been secured from British Guiana.

Work of the Year—Maha Season, 1921–22.

(*a*) *Anuradhapura.*—Fifty-two pure line selections were laid down on standard plots of 4½ feet by 40½ feet, each being repeated 8 times. They consisted of 45 selections from the ma-wi group and 7 selections from the samba group. Floods in January and February at the critical flowering stage caused a great deal of lodging, and probably made a considerable difference in yield by hindering pollination. The yields varied between 2,633 lb. and 4,512 lb. of winnowed paddy per acre (calculated) for the ma-wi selections, and between 2,547 lb. and 3,626 lb. per acre (calculated) for the samba selections. Fifty of these selections are being repeated for maha 1922–23 in an identical experiment for consistency of performance.

A field of local Tillanayakam paddy was sown down, from which ear-head selections have been made for the initiation of pure lines in maha 1922–23.

(*b*) *Peradeniya.*—The forecast of 1921 as regards the soil heterogeneity of these fields proved true. Twenty-six lines of ma-wi and 6 of samba were repeated, each 3 times, as at Anuradhapura. The season was remarkable for its persistent drought, and seedlings had to be kept in the nurseries from the first week in September until the end of October, as there was not sufficient water to prepare the main fields. Transplanting was done between October 20 and November 3, and throughout the growing period there was never enough water to flood the fields, with the exception that, on the second day of transplanting, a rainstorm (1·89 inches in a couple of hours) resulted in a washaway of newly transplanted seedlings. Despite the drought, which continued up to the flowering period, some interesting yield figures were obtained, and the trials are to be repeated in maha 1922–23. Paddy fly did not appear. Plots of local hatial were interpolated for comparison, and ear-head samples were collected for initiation of pure lines.

Yala Season, 1922.

A series of comparative trials in standard plots was initiated this season, as for maha. The material from the last yala harvest was divided into two series, according to length of growing period, series 1 being composed of mid-aged varieties, 4½–5 months, and series 2 of shorter-aged paddies, 3–4 months. The shorter-aged varieties were sown a month later than those of series 1.

(*a*) *Anuradhapura.*—Series 1.—Nineteen selections were transplanted in 4 repetitions of each. The nurseries went away well, and produced some sturdy seedlings. Harvesting of the transplanted fields began in August. Selections were made for the following yala. Plots for multiplication of seed were put down for 4 varieties.

Series 2.—Sixty-three selections were transplanted. It was intended to make 4 repetitions of each, but shortage of labour prevented cultivation to date, and 3 repetitions only were possible, the remaining fields being filled with seedlings of 10 varieties for multiplication purposes. The nurseries suffered greatly through untimely rains, and in a few cases it was only possible to make two repetitions. The season was not uniformly successful. Some very good yields were obtained, but two fields produced very scanty crops. Selections were made for the following yala. Multiplication plots of 10 varieties were put down. Paddy fly was not serious.

(*b*) *Peradeniya.*—This station has hitherto proved very disappointing for yala crops. This year an effort was made to improve the conditions, by application of lime to reduce the effect of iron deposits and by increasing the vegetable content of the soil. The results are encouraging, and some good crops of paddy have made it quite certain that the experiments can be repeated with home-grown seed instead of seed from the Anuradhapura harvest, as has been previously the case.

Series 1.—Eighteen selections were put down, each being repeated 3 times. Multiplication plots of 4 varieties were also laid down. This series produced some very fine plants, free from disease. Selection work is almost concluded for the coming yala.

Series 2.—Forty-nine selections were put down, each being repeated 3 times. Multiplication plots of 9 varieties were also laid down. The nurseries developed an alarming attack of *Piricularia oryzæ.* Many of the seedlings succumbed, and, after transplanting, there were many casualties. A great part of this series was flooded by the rise of the river in July. Growth was hampered, and series 1 was taken before series 2 was ready. Selection work on the successful varieties is in progress. Paddy fly was, as usual, a constant trouble, but never got out of hand. The incidence of this pest seems to be fairly closely correlated with the rainfall. Material damage was occasioned by bandicoots, &c. A collection of 8 paddies from brackish and flood areas was sown in April. Ear-head samples have been taken with a view to making a pure line study of these types later on.

Maha Season, 1922–23.

For this season, the experiments are repeated as nearly as possible as for 1921–22, to test consistency of performance, and to establish the relative yields of the selections.

(*a*) *Anuradhapura.*—Fifty lines are laid down here, comprising 44 ma-wi selections and 6 samba paddies. Growth, to date, is very uniform. All are doing well. Four varieties of local origin have been planted out for initiation of line selections. Four new fields are being reclaimed, and a crop of Tillanayakam is being taken. The fields used for yala 1922 proved too wet for green manure, which failed. The experiments initiated by the Divisional Agricultural Officer, Northern Division, the previous year, to test the comparative effects of broadcasting, broadcasting and thinning, transplanting, and sowing at 6-inch intervals, have been repeated, with modifications. Fourteen of the Tillanayakam ear-head selections are sown in small nurseries, spaced at 3-inch intervals, with 100 plants per nursery.

(*b*) *Peradeniya.*—Twenty-six lines of ma-wi and 6 lines of samba are planted with 6 repetitions of each. Similar plots of unselected village hatial are interpolated for comparison, and corners of fields are filled with hatial, &c. The crop is uneven, and the growth of foliage, &c., gives an interesting idea

of the relative fertility of the fields. Six hatial ear-head selections are sown at 3-inch intervals as above. A collection of 31 hill paddies has been broadcasted. The fields are for the most part swampy, and the crop is very thin and weedy.

Eight lines of the main series were put in at the School of Tropical Agriculture. These were transplanted by the students. The fields used were old nurseries, and the omission of manure has resulted in a rather stunted growth. The plots will serve as instruction for the students, and a check on the main experiments.

VEGETABLE SECTION.

The land for these experiments was felled, cleared, and brought to a tilth in about two months. The drought during the sowing period seriously hampered the proceedings. Following a selection on the grounds of similarity of type, and neighbourhood, sowings took place as under :—

Thirty-one samples of kurakkan, 47 samples of brinjals, 33 samples of chillies, 26 samples of cowpeas, 25 samples of snake-gourds.

Brinjals and chillies were sown in earthenware seed pans ; kurakkans in outdoor nursery plots ; and snake-gourds and cowpeas were planted direct in the open.

Careful tabulated records and diagrams of the types have been made.

January 31, 1923.

R. O. ILIFFE,
Economic Botanist.

VI.—REPORT OF THE CENTRAL EXPERIMENT STATION, PERADENIYA.

TEA.

THE plots of old tea under manurial experiments, which were severely pruned in October and November, 1921, suffered somewhat severe casualties. A number of dead bushes were sent to the Mycologist for examination. In the majority of these *Diplodia* was identified, while two cases of *Fomes semitostus* and *Sphærostilbe repens* occurred on bushes from swampy areas.

An inspection of the incidence of these losses threw no particular light on the effect of any of the manurial mixtures employed, but emphasized clearly (1) the inferior vitality of the unmanured plot ; (2) the superior vitality of the Manipuri indigenous over the Singlo or Assam indigenous jâts ; (3) the superiority, in their respective jâts, of the dadap plots over those without dadaps.

During the year the 18-year old dadaps were dug out of plot 149, as the new stumps which had been planted to replace them had attained sufficient growth. An inspection of the roots of the old trees, however, revealed the considerable fresh formation of nodules, and it is probable that the trees might profitably have been left standing for a few more years.

The hillside tea clearing was planted throughout with contour terraces of *Indigofera arrecta*. This has in places made excellent growth, but has failed to establish itself satisfactorily on the poorest and steepest ridges where it was most required. This plant seeds early and prolifically, the seedlings are deep-rooted and hard to eradicate, so that it is advisable to lop before the seed ripens. The interest taken in *Gliricidia maculata* as a green manure for tea has increased, and would appear fully justified by results at Peradeniya. Comparative records for a year of the loppings obtained from *Gliricidia maculata* and dadaps of the same age, both planted 16 feet by 16 feet, show that the Gliricidia have given 5 loppings yielding 14·6 tons of green material per acre, against 3 loppings giving 8·7 tons per acre from the dadaps for the same period.

The Agricultural Chemist analysed loppings from these trees, and found the Gliricidia loppings to be slightly richer in nitrogen. In addition, an examination of the roots showed an apparently greater activity in nodule formation on the part of the Gliricidia. At suitable elevations, therefore, the value of this plant would appear to be firmly established.

Out of 743 Gliricidia cuttings planted on the Experiment Station, Peradeniya, during the north-east monsoon, 1922, only 30 failed, giving 96 per cent. successes. The range of elevation at which they will succeed is not yet established. An estate in the Badulla District reported extremely favourably. A less favourable preliminary report was received from Norwood.

9,162 cuttings were supplied during the year to estates in the following districts :—Bandarawela, Badulla, Welimada, Norwood, Madulkele, Balangoda, and Dolosbage. Further orders are booked for 7,620 cuttings for estates in the Badulla, Maskeliya, Chilaw, Kadugannawa, and Jaffna Districts.

RUBBER.

The following experiments already in progress have been continued during the year :—

(1) Old manurial experiment.
(2) Old two- *versus* three-day tapping trials.
(3) Individual tree yield.

The following new experiments were started in April, 1922.

(1) New two- *versus* three-day tapping trials. (The cut in the case of the trees tapped every three days being started at two-thirds the height from the ground of the cut on the trees tapped on alternate days).
(2) Tapping alternate days throughout the year *versus* tapping daily in alternate months.
(3) Tapping of the hilltop rubber planted in three methods—
    (*a*) 20 feet by 20 feet.
    (*b*) In avenues 15 feet by 15 feet, 40 feet between avenues.
    (*c*) In clumps of 4 trees 15 feet by 15 feet, 40 feet between clumps.

    Half of each of the above groups are tapped in a V-cut, and half on a single half spiral cut.
(4) Tapping of the Bandaratenne Avenue rubber under manurial mixtures with and without lime.

It is too early to give any indication of results of these new experiments as yet.

A system of recording weekly latex yields in cubic centimetres of all trees in tapping in the old manurial experiments was inaugurated in July.

With the increase in production of rubber resulting from these new experiments, steps have been taken to supersede the unsmoked biscuits formerly turned out by a product more acceptable to the market. Part of an old building has been converted into a smoke house. A new plain roller and a diamond roller has been purchased, and a good quality smoked sheet is now turned out.

A well attended demonstration in rubber budding was held at the Experiment Station on October 11. Commencing on October 18, twelve 14-month old nursery stumps grown from seed of No. 2 tree, Henaratgoda, were budded daily. The buds were taken from the twelve best-yielding trees from plots 14 and 15, also grown from seed of No. 2 tree, Henaratgoda and under individual yield experiment. Buds from a different parent tree were used for each batch of twelve stumps.

In each batch of twelve, four were budded on the Deli system (one of the methods advocated in Java), four on the rectangular patch system, and four on the diamond patch system. The last method is one adopted by Mukalana estate, Matugama, and demonstrated at the Experiment Station on October 11 by Mr. D. M. Rajapakse.

Coffee.

The interest in the cultivation of the Robusta types of coffee is still maintained. The demand for seed from the Experiment Station abated somewhat. Some 450 lb. of seed were supplied against 537 lb. in 1921. This may be attributed to the fact that several estates are now selling seed. Circulars containing a number of questions on the growth and general progress of these coffees were distributed among growers during the year. The replies received were somewhat meagre, but indicate that these coffees can be successfully grown on a considerable variety of soils, under a rainfall of 80 to 100 inches, and at elevations between sea level and 3,000 feet. Evidence shows that shade is beneficial, if not a necessity, and that the health of coffee usually suffers by its absence. No reliable records of yields were sent in, but at the Experiment Station, Peradeniya, yields ranging between 2·09 and 3·70 lb. of berries per tree were obtained for the season 1921–22. This is an improvement on previous years, and will probably be exceeded during the season 1922–23. Uganda has been giving the highest average yield in three years. Among diseases, dieback is by far the most troublesome at Peradeniya. Spraying with Bordeaux mixture has been unsuccessfully tried, and the condition is generally ascribed to physiological causes. Fortnightly picking and burning of dieback branches was continued throughout the year.

A small area of 12-year old Robusta, which had suffered severely from dieback, and had few lower branches left, was pruned down to 9 inches from the ground. From these stumps, selected suckers were allowed to grow up, the remainder being removed on appearance. The selected suckers have made rapid and vigorous growth, and appear likely to bear a crop again at eighteen months from the time of cutting. Some losses were sustained from breakage by wind, and staking appears necessary. It would appear that such cutting down is to be recommended in old wornout coffee.

Seed of two strains of coffee for which disease resistance is claimed—Kent's Special Arabica and Jackson's Hybrid—was obtained from South India early in the year. The germination, growth, and health of the nursery plants was very satisfactory.

A newly opened area of 6 acres was planted with these coffees (3 acres of each variety) in the north-east monsoon. The nursery plants were all lifted with a transplanting tool, a method which has proved most satisfactory. The health and appearance of these plants was at the end of the year good.

Gliricidia maculata was planted as shade for this coffee, 96 per cent. of the stumps planted were successful, a percentage that is seldom obtained with dadaps.

In order to supply the constant demand for information with regard to coffee planting, the leaflet on the cultivation of Robusta coffees was re-written during the year.

Coconuts.

Further nuts of the nineteen varieties supplied by Gate Mudaliyar A. E. Rajapakse were received during the year and planted in nurseries. The plants grown from the nuts of these varieties received in 1921 were planted out in June in the fodder grass plots. Heavy rains followed, which affected some plants adversely.

Experiments were started during the year in planting nuts in different positions, *e.g.*, (1) vertically, (2) horizontally, (3) at an angle of about 45°, (4) in the position assumed by the nuts when dropped from a height on to a level ground.

The same experiment is being duplicated with nuts from the same two trees which have fallen naturally.

The dwarf coconuts from the Federated Malay States planted out in 1921 have not done very well. The ground is probably too wet. Some are now making fair growth.

Fodder Plants.

A separate report was published in September on the results of one year's trials of fodder grasses.

Guinea grass (*Panicum maximum*) proved the best all-round fodder grass for this locality. These trials are being continued.

Sudan grass gave most luxuriant growth at the first crop, but cannot be grown as a perennial.

Kikuyu grass, roots of which were received from Australia in 1921, was after multiplication planted out over an area of one acre. Fair growth was made, but owing to its creeping habit weeding was impossible when the grass was once established, and a considerable admixture of weeds and other grasses is probable.

Lucerne was again tried. One moderate crop was taken, after which the plants gradually died out.

Fibres.

New Zealand flax planted in 1921 proved a failure at this elevation and was finally uprooted.

The interest taken in Sisal hemp during the year was considerable. 18,000 plants from the Experiment Station nurseries were disposed of during the year, mostly to the Southern Province and the Kurunegala District.

CEREALS.

Further trials of three American maize varieties—Brazos white corn, United States Selection 119, and Singleton strawberry corn—were made in the newly formed annual economic area. The order of yield, as in the first trial, was as above stated. Possibly as a result of the careful seed selection carried out from the first crop, the yield of every variety showed an increase. Brazos white corn gave 1,376 lb. per acre, and has proved an excellent variety for this district. Some seed of this corn was distributed to the public, and more is available.

CAMPHOR.

Distillation was continued at intervals during the year. On the recommendation of a correspondent in South India, attempts were made to use large chatties for boiling the camphor leaves and twigs. In every case, however, the chatties cracked after a day or two's use. Since the boiler which had originally been used for distillation had proved unsatisfactory, further distillations were conducted by boiling the leaves and twigs in a large copper retort which was available on the station. With this apparatus camphor up to ·67 per cent. of the weight of leaves and twigs was obtained, and though the plant is far from perfect, it is noted that not much better results have been obtained in the Federated Malay States after a long series of experiments and with more costly apparatus. Leaves alone stripped from the twigs yielded 1·08 per cent. of camphor, but the method is too laborious to be recommended. It has been established here, as in the Federated Malay States, that distillation for more than three hours is not profitable.

Far more individual attention and expenditure in experimental manufacture of distilling plant is required than has been available during the past year.

A local firm of chemists purchased the greater part of the camphor turned out by the Experiment Station at Rs. 3·25 per lb., and at this price distillation appeared profitable even with the imperfect apparatus available.

It is probable that a three-unit plant is to be preferred—(1) a low pressure boiler, (2) a cylindrical iron still, (3) a galvanized iron condenser.

A plant on these lines has been designed by a Ceylon firm of engineers for a planter interested in camphor.

At Peradeniya only two units have been employed—(1) the copper retort in which the leaves and small twigs were boiled in water, (2) three wooden condensing boxes fitted with galvanized iron lids. The latter (originally fitted with wooden lids) formed part of a distilling plant made after the Formosan model.

TUBERS.

Yield trials of sweet potatoes were continued, and a few of the less promising varieties eliminated. Full results will not be available for a year or more, as it is proposed to take at least three yields from each variety, and owing to the large number of varieties grown much space is required. At present Sealy's, Jersey, and Red Jersey, three varieties originally imported from Mauritius, appear to be the heaviest yielders.

Similar work was continued with manioc varieties.

LEGUMES.

Trials with cowpeas and cluster beans in the new annual economic area proved disappointing. Snails, as usual, did considerable damage, and the soil on this area appears very poor and patchy and will require fairly heavy manuring.

Three new cowpeas were received for trial.

GENERAL.

A considerable length of earth road was metalled. This work is being continued. The north-east monsoon was characterized by persistent wet and dull weather, whereby planting out of coffee was much facilitated.

The rainfall on the Experiment Station was as follows :—

1922.	Inches.	Wet Days.	1922.	Inches.	Wet Days.
January ..	2·86	5	September ..	7·14	15
February ..	5·42	6	October ..	13·79	17
March ..	1·05	4	November ..	11·21	17
April ..	6·57	9	December ..	6·19	5
May ..	2·14	8			
June ..	10·45	21	Total ..	83·27	
July ..	10·99	19			
August ..	5·46	15			

T. H. HOLLAND,
Manager, Experiment Station, Peradeniya.

VII.—REPORTS OF DIVISIONAL AGRICULTURAL OFFICERS, AND OF AGRICULTURAL INSTRUCTORS CONTROLLED FROM HEAD OFFICE.

CENTRAL DIVISION.

DISTRICT COMMITTEES.

RESOLUTIONS were passed by the District Food Production Committees of Kandy, Matale, Nuwara Eliya, and Kegalla asking that their designations be in future "District Agricultural Committees," and that their constitution and functions be altered accordingly. These Committees tend to become the natural centres for discussion of agricultural matters affecting the districts.

Nalanda Experiment Station.

Of the total of 34 acres available at this station, 12 acres have been cleared. The irrigation canal from which the water supply is drawn has been repaired for one mile of its length. Sixty plots of standard size and shape have been laid down for the purpose of carrying out trials with paddy. Comparative trials of varieties of cotton, tobacco, maize, and tubers are being made.

The establishment of this station has added to the value of the work of the Divisional Staff. It is unlikely that the present vote will be sufficient to allow of further extension of the clearing.

Co-operative Paddy Trials.

During the maha season, (October, 1921, to March, 1922, and October, 1922, to March, 1923) manurial trials were carried out by Instructors on villagers' fields. Standard four-plot trials with ephosphosphate, bone meal, green dressings, and animal meal were carried out as follows :—

	Kandy.	Matale.	Nuwara Eliya.	Kegalla.
Maha, 1921 ..	2 ..	3 ..	— ..	3
Maha, 1922 ..	1 ..	1 ..	4 ..	4

In addition, about sixty minor trials with other manures and with various methods of transplanting were made in these districts. An effort will be made to carry out some of these trials in duplicate or triplicate. The errors are considerable when working under the present conditions, and duplication is necessary in order to secure more reliable data.

There is a tendency on the part of Instructors to devote most of their efforts to minor trials. Each officer will in future concentrate upon at least one standard plot series. Two distinct aims should be evident: first, the obtaining of accurate information from standard trials; and second, inducing villagers to try different methods and manures.

Competitions and Shows.

Plans have been set in hand for a district show in Kandy and a village show at Dambulla in 1923. There may possibly be a village or division show in Matale South also.

Prize competitions were carried out during 1922 in all four districts in connection with paddy and vegetable gardens. In some cases these were carried out by District Committees. Competitions for cacao growers in Matale and at Katugastota would be beneficial. Rules governing cacao and paddy competitions are needed.

Agricultural Instruction.

In order to systematize instruction, efforts were made in 1922 to organize village agricultural societies. To date seven have been started. It is evident that for many years the task of keeping these active will devolve on Department officers. They should eventually be centres for discussion of all village agricultural matters, and should be linked to the District Agricultural Committees. The work of Agricultural Instructors in connection with shows, competitions, and experiments has been organized and efforts are being made for more systematic work in the matter of lectures to village cultivators.

School and Home Gardens.

The work in school gardens has been satisfactory, but the home garden movement has practically disappeared from this division. The seconding of an Agricultural Instructor specially for this work should help to develop it once more.

The following is a list of school gardens in the division :—Kandy 49, Matale 18, Nuwara Eliya 15, Kegalla 28. There were in addition 24 school gardens awaiting registration at the end of 1922.

Farm School, Peradeniya.

This is dealt with in a separate report. A new syllabus is in course of preparation. Among the requirements for the second-year course should be a thesis describing some simple research work on an agricultural problem.

The laboratory has been partly fitted up and definite courses in chemistry and botany begun.

Report of the Peradeniya Farm School for the Year 1922.

Classes.

At the commencement of the year there were three classes :—

(*a*) English : second-year students 17 ; first-year students 14.
(*b*) Vernacular teachers : 12.

At the final examination of the second-year students which was held in March, fifteen students passed and gained the certificates of the school. One student was placed in the first class and six students in the second class. The final examination of the teachers was held at the same time, and all twelve men passed successfully ; one being awarded a silver medal and two men bronze medals. The school year commenced in May, when two fresh classes of first-year students numbering 20 and teachers numbering 12 were formed. A class of teacher students from the Peradeniya Training Colony continues to attend a course of lectures in general agriculture.

Staff.

On the relinquishment of office by the Registrar at the end of 1921, Mr. J. C. Drieberg was appointed in charge of the school and hostel as Farm School Officer ; Mr. G. V. Wickramesekera holds the post of Assistant Farm School Officer ; Mr. C. Wickramaratne continues in charge of the work of the Vernacular Teachers' Class ; Mr. E. S. de S. Jayasundera, who passed in March, attached himself at the school as a probationer in May, and appointed as Farm and Laboratory Assistant in November. The work of the school is under the general supervision of the Divisional Agricultural Officer, Central Division.

Tour.

The annual tour of the school took place in February, when the staff and students visited places of agricultural interest in Colombo, Negombo, and Kalutara.

In addition, a visit was paid in the company of the Divisional Agricultural Officer, Central Division to the Nalanda Experiment Station and to Ross and estates.

Prize-giving.

The annual prize-giving was held on August 5,when the Government Agent, Central Province, presided, and Mrs. Kindersley distributed the awards. The speaker on this occasion was Dr. W. A. de Silva.

A prize for general efficiency in agriculture, donated by His Excellency the Governor, was awarded for the first time.

The following awards and certificates were given to the students who were successful at the March examination :—

Medals.

"The Rajapakse Gold Medal," for the best all-round student of the course, presented by Gate Mudaliyar A. E. Rajapakse, J.P., awarded to Lionel A. J. Abeyesundere.

Prizes.

His Excellency the Governor's Prize, presented for general efficiency in Practical Agriculture, awarded to Lionel A. J. Abeyesundere.

For Agriculture :—

1st Prize, presented by Sir Solomons Dias Bandaranaike, Kt., awarded to Lionel A. J. Abeyesundere.
2nd Prize, presented by Muhandiram N. Wickramaratne, awarded to F. Donald Peries.

For Economic Products :—

1st Prize, presented by the Hon. Mr. H. L. De Mel, C.B.E., awarded to E. Stanser de S. Jayasundera.
2nd Prize, presented by W. A. de Silva, Esq. awarded to K. C. Victor de Silva.

For Agricultural Botany :—

1st Prize, presented by V. M. Muttukumaru, Esq., Maniagar, awarded to F. Donald Peries.
2nd Prize, presented by J. C. Ratwatte, Esq., awarded to E. Stanser de S. Jayasundera.

For Agricultural Chemistry :—

1st Prize, presented by R. Salgado, Esq., awarded to Lionel A. J. Abeyesundere.
2nd Prize, by E. A. Elapata, Esq., awarded to Don Jayasena Welaratne.

For Agricultural Zoology :—

1st Prize, presented by the Hon. Dr. H. M. Fernando, awarded to Francis A. Wickramasuriya.
2nd Prize, presented by Graham Pandittasekera, Esq., awarded to Ernest V. Ponnudurai.

Certificates.

Class 1.—L. A. J. Abeyesundere.

Class 2.—K. C. V. de Silva, E. S. de S. Jayasundera, F. D. Peries, E. V. Ponnudurai, D. J. Welaratne, F. A. Wickramasuriya.

Pass.—V. Dharmadasa, E. D. Muttettuwegama, S. O. Peiris, C. D. Perera, S. J. Rambukpota.

Partial Certificates.—N. S. G. Karunaratne, K. A. B. Perera, E. R. D. Schrader.

Work.

The laboratory commenced to be used in October for practical work in chemistry, botany, and agricultural zoology, though it was only partly fitted. A small stock of chemicals and apparatus was obtained from India ; and five microscopes were kindly loaned by the Principal of the University College.

The students engage in a good deal of field work.

The crops on the students' plots were particularly satisfactory. The paddy field is a special feature of the students' practical work and yielded two crops in 1922. The harvest of the 1921 maha crop took place at the end of February ; while transplanting for this year's maha was carried out in the middle of September, the nurseries have been sown in the first week of August. Half a bushel of selected Hatiel was found sufficient for transplanting a little over an acre. Practice in tapping, rolling, and smoking rubber, as well as pruning and plucking tea, is afforded.

A commencement with bee-keeping has been made, and it is intended to centralize the work of the Department in bee-keeping at the school next year. The working of a block of about 4 acres of rubber, tea, and coconuts, acquired from New Peradeniya estate, has been added to the activities of the school.

His Excellency the Acting Governor paid an official visit to the school on November 17.

SOUTHERN DIVISION.

THE COTTON EXPERIMENTAL STATION AT AMBALANTOTA.

A short resumè of the results of the Amabalantota cotton plots during 1922 are as follows:—

Fifty-five acres were taken into cultivation at Ambalantota and 10 acres at Kiula. The soil at Ambalantota was of a light loam, and the soil at Kiula was of a sandy nature. There were nine varieties tried altogether, and with the exception of Navassari Broach the results were satisfactory.

Of the successful eight varieties the acreage of each and the yields obtained were as follows :—

	Acres.	Lb. per Acre.
Cambodia	29⅘	659
Durango	18½	720
Karanganni	6½	492
Ashmoni	⅛	447
Sea Island	1⅚	630
Sakellaridis	2⅖	438
Assali	⅓	627
Cauto	1/10	354

The outstanding best varieties were Durango and Cambodia, which yielded 721 lb. and 659 lb. per acre, respectively.

The rainfall from the planting of seed to the end of harvest was as follows :—

October	5·15	March	2·56
November	2·43	April	3·28
December	3·24	May	3·38
January	0·64	June	3·40
February	2·20	July	0·05

The 1921 crop suffered very little from pests which were easily controlled. As the result of the encouraging results obtained last year, approximately 300 acres are under cultivation in the Hambantota District this year. Experiments are being conducted this season with Durango, Sea Island, Karranganni, Cambodia local seed, and Cambodia (No. 15) a new strain from India. The effect of nitrate of soda and cowdung manures are also being tried.

Before planting this year the area under experiment was ploughed and harrowed by a tractor, and in spite of the stumps and soil conditions a good seed bed was obtained. On November 20 the whole crop was very suddenly attacked with the looping caterpillar, and not a single plant escaped the ravages of this pest. Control measures were taken in hand immediately by spraying with Paris Green, and the plants have now fully recovered from the attack.

All the school gardens in the Hambantota and Tangalla Districts have been supplied with a free issue of cotton seed.

Paddy Manurial Trials.

The following manurial experiments were conducted last year, as follows :—

Yala Season.—Bentota, Usk Valley, Kekanadura, Tapugoda, and Niyawela.

Maha Season.—Thihagoda, Kamburupitiya, Kirinda, Hakmana, Atureliya, Wattegamayaya Goigodapangua, Kokmaduwa, Deniyaya, Halpatota, Kalahe, Heenetigala, Pitawala, Batapola, Matugama, Welipenna, Horawala, Ittapana, Kobowella estate, and Kalupahana.

The results of the experiments for yala season have already been reported elsewhere in full detail, The best results generally were obtained with fish manure, bone meal, ephos phosphate, and green manures, the latter being especially successful when applied in sufficiently large quantities.

Paddy Transplanting.

The increase in the number and acreage of transplanted paddy plots is especially noteworthy in the Weligama and Matara Districts. The difficulty of getting the transplanted paddy to ripen at the same time as the broadcasted paddy is being gradually overcome. One block of 80 acres was successfully transplanted in the Matara District during maha season last year. Other districts are not taking so enthusiastically to transplanting owing to the problem of irrigation.

Paddy Seed Selection and Green Manuring.

Paddy seed selected plots and green manure plots were tried in each of the Agricultural Instructor's areas last year, but green manuring is becoming much more general than the former.

Other Paddy Experiments.

Several paddy experiments are being tried with pure line variety seed sent by the Economic Botanist, Peradeniya, viz., at Batapola and Welgama. At present the plants look very flourishing.

Salt water paddy trials are also being carried out at (1) Lewanduwa, Ittapana, and (2) at Meegambadda. At this latter place there are over 1,000 acres of uncultivated paddy lands owing to salt water.

One of the chief drawbacks in the cultivated paddy fields, especially in the Kalutara District, is that there are the Tattumaru and Kattimaru systems. By Tattumaru is meant cultivation of a plot of legally undivided paddy field by its owners in yearly rotation. By Kattimaru, cultivation of a legally undivided paddy land in yearly rotations according to the fertility of the soil by its owners. In adopting both these systems, the cultivation of a field is not continuously cultivated by the same individual. Consequently the shareholders do not take much interest towards improving the fertility of the soil. The reason is obvious, as he will not reap the benefits of his labour during the next season, year, or even in the near future.

Agricultural Competitions.

The following competitions were held and conducted by the Department during the year :—

Paddy Transplanting.

Matara (for yala and maha season) (Kandaboda pattu, Four Gravets, Wellaboda pattu and Gangaboda pattus, Weligam korale). Galle District (Bentota-Walallawiti, Wellaboda pattu). Kalutara District (Pasdun korale east, Pasdun korale west, Rayigam korale).

Vegetable Garden Competitions.

Hambantota District (Magam pattu). Matara District (Kandabadapattu, Four Gravets, Wellaboda pattu, and Gangabada pattus). Galle District (all the pattus and Bentota-Walallawiti korale), and Police vegetable garden competition.

Kalutara District (Pasdun korale east and west and the totamunes).

I should like to make special mention of prizes offered by the following donors:—

Gold medal given by E. W. Goonatilleke, Esq., for the best plot of transplanted paddy, Weligam korale. Rs. 100 given by Muhandiram Vaithiasekara for the best school garden in the Kalutara District. Rs. 25 given by E. D. Bowman, Esq., for the best school garden in the Galle District.

In addition to the above competitions, Rs. 908 were awarded as prizes to the various school gardens.

AGRICULTURAL SHOWS.

The following agricultural shows were held during the year :—Galle District (Hiniduma, Hikkaduwa, Bentota). Matara District (Weligama). Hambantota District (Tissamaharama). Kalutara District (Horana, Bellana, Matugama, Panadure).

The reports of these shows and competitions have all appeared in the press. The success generally attained has been due to the hearty co-operation of all the agricultural staff and headmen. All the shows were very well attended by the public and a great interest was shown in the exhibits. The shows at Weligama, Hikkaduwa, Bellana, and Tissamaharama are worthy of special mention.

FOOD PRODUCTION COMMITTEES.

Food Production Committee meetings have been held at Hambantota, Matara, Galle, and Kalutara.

PLOUGHING DEMONSTRATION.

Ploughing demonstrations were given in each of the Agricultural Instructors' areas during the year by the Goiya, Meston, and Sinhalese ploughs. The Goiya and Meston ploughs were more favoured than the Sinhalese plough, the draught of which was too great for cattle in the Southern Province. As a result of these demonstrations several ploughs of the Meston type are now in use in the Matara and Kalutara Districts.

SCHOOL GARDENS.

The majority of school gardens in the Southern Division have reached a high standard of efficiency. The total of home gardens attached to these school gardens is steadily increasing, and the boys are beginning to take a pride in their work. The system adopted is to apply to Peradeniya twice yearly for seeds and cuttings which are sent to the various school gardens. Arrangements are, however, being made to raise the plants, &c., in the demonstration gardens of the divisions, in future, as far as possible. The number of unregistered school gardens is 55, and recommendations have been forwarded to register these gardens as soon as funds become available.

Almost all the school gardens were supplied with new implements, chiefly buckets, mamoties, and watering cans.

Special attention has been given to the establishment of satisfatory fruit plots in the school gardens, and to the question of growing hedges.

Paddy cultivation is being attempted in lands attached to several schools. Teachers and the boys are interesting themselves in this cultivation.

Beehives were also supplied to a few of the schools. Teachers, on the whole, have done good work in school gardens during the year under review.

PESTS AND DISEASES.

The eradication of the water hyacinth pest from the Tangalla district received special attention during the year. Several tanks, namely, Weliwewa and Alutwewa, were completely covered with this weed. The beetle pest of coconuts has received special attention in the Matara District and Bentota korale and control measures have been taken.

Various pests and diseases of paddy, vegetable, coconuts, rubber, cinnamon, cotton, tea, &c., have been dealt with in this office and remedial measures given.

EXPERIMENTAL GARDENS.

These gardens are steadily increasing in usefulness, and some interesting results have been obtained in the different varieties of vegetables, &c. The varieties of seeds and cuttings, &c., that prove best are distributed to villagers and home gardens. Efforts are being made to raise sufficient seed for the use of all the school gardens in the Southern Division.

F. BURNETT,

January 30, 1923. Divisional Agricultural Officer, Southern Division.

NORTHERN DIVISION.

LECTURES AND DEMONSTRATIONS.

Fourteen lectures to cultivators were given during the year by Mr. W. P. A. Cooke, Farm School Officer. The subjects included agricultural cultivation, dry farming as applied to tobacco, cultivation of sorghums, co-operation, and paddy cultivation.

A ploughing demonstration was given at the Anuradhapura Experiment Station, in which the Eureka, Meston, and L. N. O. ploughs were used. The Meston plough appears to have found most favour. In addition, the usual instruction has been given by the Agricultural Instructors, Trincomalee and Mannar, in the course of their rounds. Mr. Cooke visited eight coconut estates in the Jaffna peninsula. The spread of ploughing and cultivation in coconut estates is most marked.

In the Mannar District the encouraging of green manuring was given special attention. The Instructor in this district also distributed a considerable quantity of vegetable seeds.

Paddy Manurial Trials.

Manurial trials with fish, guano, superphosphate, sulphate of ammonia, and green dressings were carried out in the Jaffna, Anuradhapura, Trincomalee, and Mannar Districts. The best results in nearly every case were given by superphosphate and green leaf, with the addition of a top dressing of sulphate of ammonia.

Food Production Committee.

Meetings of the above have been regularly attended. The Divisional Officer assisted in judging garden competitions arranged by these Committees in the Mullaittivu and Trincomalee Districts, and at a successful agricultural show held at Trincomalee in May.

Competitions.

The gold medal for the best paddy cultivation, offered by Dr. C. Brito Babapulle, was allotted to the Northern Province for the north-east monsoon season 1922–23. The competition is open to members of Co-operative Societies. Twenty-nine original entries were received. A preliminary inspection of a number of these plots was made by the Divisional Officer at the end of the year, with the object of eliminating inferior plots before the final judging.

A paddy competition was held in the Trincomalee District under the auspices of the Trincomalee Food Production Committee, entries were good and substantial prizes were earned. The above Committee also organized a successful garden competition. A garden competition was organized by the Mullaittivu Food Production Committee, in which the Farm School Officer assisted.

School Gardens.

There were 31 registered school gardens at the end of the year. Inspection was carried out by the Divisional Agricultural Officer; the Farm School Officer; the Assistant Manager, Anuradhapura Experiment Station; and the Agricultural Instructors, Trincomalee and Mannar. Fifteen prizes were awarded during the year, and five certificates.

Tobacco at Jaffna.

The depression in the tobacco trade continued, and it was decided to distribute all available seed of White Burley tobacco, giving an agreement to buy in the plants at rates varying from 5 to 20 cents per plant for curing and export to London. The demand for seed of White Burley tobacco was greater than the available supply.

Dry Zone Experiment Station, Anuradhapura.

Paddy.—A paddy growing experiment in three series started in November, 1921, was completed in February, 1922, to find out whether there is any difference in yield by (1) sowing seed in a nursery and transplanting later, (2) planting germinated seed 6 inches apart, (3) broadcasting at the rate of 1½ bushel per acre. Each plot was repeated three times, a week later in each case. The transplanted plots gave the best yield, and the broadcasted the least. The average acre yield for the whole area was 40 bushels 25 measures of paddy and 724¾ lb. straw. The experiment has been repeated in December with certain modifications.

Paddy Manurial Experiments.—The manurial experiments started in December, 1921, resulted as follows:—The superphosphate plot yielded 51¼ bushels of paddy per acre and 4,810 lb. of straw. Fish, 50 bushels of paddy and 4,050 lb. of straw per acre. Control, 28¾ bushels of paddy and 2,935 lb. of straw per acre.

The same experiment has been repeated in December this year.

Paddy Milling Experiments.—Fifteen bushels each of four varieties of paddy harvested from the chena plots were sent to the jail rice mill. The Government Agent reported that the percentage obtained was over 50 per cent. as the breakage was less. The rice was much superior in quality to the rice produced out of ordinary village paddy:—

Variety.	Bushels milled.	Rice obtained. Bushels.	Measures.
Murungan	15 ..	7	25
Muppangan	15 ..	7	22
Illankalayan	15 ..	7	21
Annaikodam	15 ..	7	10

Pests of Paddy.—The swarming caterpillar (*Spodoptera mauritia*) appeared again this year in the month of May, though not in such large numbers. Hand picking was resorted to.

The paddy fly increased in numbers in June and December. Hand nets were employed, and cheddy in the vicinity of the plots were cut down.

Fibres.—Fourcroea gigantea, Mauritius hemp. The plants have grown most luxuriantly, the leaves reaching a length of 10 to 15 feet.

A few of the plants began to pole, but were immediately cut down.

Weeding had to be abandoned about the middle of the year, as the plants had interlaced with each other.

Agave rigida var. Sisalana. Sisal hemp. First planted in December, 1918. These have now reached the stage for extracting fibre. The plants have grown very well and withstood the long period of drought experienced this year.

The fibre machine received from the Government of Mauritius during the latter part of the year was given a trial run. Leaves of Sisal and Mauritius were fed through the rapidly revolving decorticators. The quality and percentage of fibre turned out for the first time was considered fair.

The lower portion of the lime area found unsuitable for limes have been planted with double rows of Sisal and single rows of Mauritius between the rows of lime.

Coconuts.—Planted in December, 1916, on unirrigable land have begun to flower and fruit six years from planting. The land during the year has been regularly ploughed once in three months and disc-harrowed once a month and the palms freed from beetles and red weevil.

Citrus.—Limes. Some of the plants have begun to fruit. Most of the supplies put in last year are doing well.

The British Guiana trees gave good crops during the year. Several orders for plants and seeds have been executed.

The lemons, citrus, and Seville orange have again this year given excellent crops. It is unfortunate that there is no demand for these in the local markets.

Some of the trees were effected with (*Pseudomonas citri*) citrus canker, pink disease (*Corticium salmonicolor*), and several minor leaf diseases.

Coffee.—The Robusta trees have yielded fair crops. Dieback and strong winds greatly affected the trees.

Oil Palms.—575 lb. of dry seed have been collected during the year, as against 542 lb. collected during the preceding year.

Four varieties of oil palm seed from Nigeria received through the Director of Agriculture, Kew, and five from the Department of Agriculture, Laeken, were planted in nurseries and the plants subsequently planted out.

The black beetle and the red weevil were found in large numbers during the months of July and August.

Fruit Section.—Mangoes, pineapples, oranges, soursops, guavas, and mulberries gave fair crops during the season.

Sugar Cane.—The old plot of sugar cane has been trenched, cattle manure applied, and re-planted with the following eight varieties of canes (five rows of each):—Striped tanna, Sealy's seedling, Red Top Mauritius, B. 3,390, D. 117, P. 131, P. 55, and Sin Nombre.

Canes were sent to the Agricultural Chemist for analysis.

Miscellaneous Crops.—Chillies.—One-tenth of an acre yielded 126 lb. of dry chillies, or an acre yield of 1,260 lb.

Onions.—One-tenth of an acre yielded 129 lb. of red onions, or an acre yield of 1,290 lb.

Cowpeas.—The erect varieties matured in forty days from sowing. The creeping variety took three months. The growth of both varieties were very satisfactory, especially the creeper, which made an excellent cover crop. 23 measures of clean seed were obtained from one tenth of an acre.

Ground Nuts.—Two bushels and 27 measures of ground nuts were obtained from a self-sown plot of one-tenth of an acre.

Manioc.—The following yields were obtained from the varieties mentioned below :—

Manioc de Table	.. ..	170 lb., or 12,920 lb. per acre
Smallings	.. ..	160 lb., or 12,160 lb. per acre
Butter stick	.. ..	121 lb., or 9,196 lb. per acre
Trinidad	.. ..	114 lb., or 8,664 lb. per acre
Singapore	.. ..	105 lb., or 7,980 lb. per acre
Cassava Buereum	.. ..	104 lb., or 7,904 lb. per acre
Local variety	.. ..	90 lb., or 6,840 lb. per acre

Sweet Potatoes.—The only variety which did well was the raisin variety, which yielded an acre yield of 18,500 lb. The tubers were very large and floury. The plants were lifted exactly three months from planting.

Maize.—The crop of hickory king maize was poor, only 710 lb. of cobs being obtained per acre. The local maize yielded better, with 1,930 lb. of cobs per acre.

Kapok.—This crop has been planted on high land at the end of the new clearing. It has also been planted along the boundaries of the station.

Algaroba Bean.—Plants have been put along the bund of the main water channel.

Centrosema Plumeri.—This bean, which is grown largely as a cover crop in the Malay States, has not done well at Anuradhapura. The growth was slow and poor.

Garden Crops.—The crops raised at the station this year were as follows :—*Cicer aurantium* (horse gram), *Dolichos biflorus* (kollu), gingelly, dhall, *Coix lachryma jobi* (Job's tears), fodder grasses, kurakkan, green and black gram, lentils, and various vegetables.

New Works.—The unsightly pond opposite the cooly lines has been filled up. A new cattle shed and manure shed has been erected (temporary), and a building for the fibre machinery. Levels of the new clearing have been taken for irrigation purposes.

Labour.—The health of the labour force has been more satisfactory than previous years. Drugs were regularly administered.

Weather.—54·09 inches of rain fell during the year, as against 71·51 inches the previous year. The wettest months were February, October, November, and December.

Prison Labour.—The total outturn of prisoners during the year was considerably less than the previous year. The daily outturn fell to 39 per cent. during the month of July. This was not due to ill-health, but to requirements of prisoners for other work in the Island. The prisoners were chiefly engaged in cutting and clearing 12 acres of felled jungle, extracting stumps from the cleared area, felling and clearing a further area of 10 acres, erecting bunds, sowing and harvesting paddy and gingelly, and preparing fields.

The work of the prisoners has been satisfactory. The guards responsible for the supervision of the various works have worked wholeheartedly and obtained the maximum quantity of work possible from the prisoners.

Experiment Station, Jaffna.

Buildings and New Works.—The Farm Manager's bungalow, and the cattle shed and manure pit were completed during the year. The Farm School Officer's bungalow was nearing completion at the end of the year. The deepening of the new well was completed. This well gives an excellent supply of water and has enabled the irrigable area to be extended. The planting of tulip trees along the boundary fence was completed. About ¼ acre of fresh land was rendered irrigable by lowering the level.

Implements.—Two monsoon ploughs and one seed drill were obtained from the Madras Department. The ploughs are doing good work, and the seed drill was successfully used for sowing "Cambu."

Season.—The season was not good. 40·77 inches of rain were registered by the nearest recording station. Heavy rain during January and February was unfavourable to tobacco, onions, and cotton. The north-east monsoon was rather late and sowing was delayed.

Tobacco.—3,000 plants of White Burley, 1,000 of Mauritius, and 1,000 of local cigar tobacco were planted out and fair crops obtained. The cultivation of White Burley is gradually being extended. During the year 4,611 plants were purchased from cultivators at rates varying from 5 to 25 cents. 58 oz. of seed has been distributed for planting during the coming season.

Some of the Mauritius tobacco leaves were air-cured, while some were cured after the local fashion for cigar tobacco. Local merchants report favourably on this tobacco. In all 321 lb. of White Burley was obtained from purchased leaves and 355 lb. from the Experiment Station crop.

Kurakkan.—Varietal tests were repeated with eight Mysore, one Madras, and two local varieties. The best yielders were "H. 7. Green open," "H. 3. Green open," "H. 13. Green open."

The trials will be repeated.

Twenty-one single plant selections were planted out in small plots.

A bulk crop of kurakkan from ¾ acre gave 1,176 lb. of grain and 2,310 lb. of straw per acre.

A cultivation experiment was carried out in which half the area was ploughed with an improved plough and half with a country plough. The former gave an increase of 94 lb. of grain per acre over the latter. The experiment will be repeated.

Italian Millet (Tenai).—Comparative trials were made with two local varieties: Ventenai and Chentenai. The varieties yielded 1,688 and 1,568 lb. per acre respectively.

Sorghum (Cholam).—Sorghum has proved a decided success as a fodder crop. An acre of Peria Manjal, a popular South Indian variety, grown mainly for fodder, yielded 180 lb. of grain and 9,000 lb. of dry straw, which was sufficient for two pairs of bulls for three months.

Guinea grass grown under irrigation gave 22,064 lb. of green fodder per acre in a year.

Sudan grass has done well and yields one heavy cut.

Lucerne has yielded four cuts to date and promises well.

Cowpeas grown along the bunds relieved a temporary scarcity of fodder during February and March.

Chillies.—A total area of 1 acre was planted with this crop, and an average acre yield of 938 lb. of dried chillies obtained an acre yield of 3,040 lb. of green chillies was obtained from one-eighth acre plot. Five single plant selections were planted out. All promise well.

Groundnuts.—Half an acre yielded at the rate of 1,400 lb. per acre, a figure which compares favourably with South Indian yields. Harvesting was somewhat costly as the local labour was not used to the work.

Onions.—A comparison was made between planting in ridges and in beds. The former method produced the larger yield.

Green Gram.—One acre yielded 432 lb. of cleaned produce and 3,300 lb. of fodder, which is a good yield for the locality.

Maize.—Nitrate of soda with this crop produced an increased yield of 8 bushels per acre over an unmanured plot.

Cotton.—Plots of Cambodia, karanganni, and sahilla were sown in October. Though promising at first, untimely heavy rains in January and February ruined the crop. A yield of 250 lb. per acre was obtained from the Cambodia.

Cucurbits.—A collection of local and introduced pumpkins, melons, and gourds were successfully grown. These attracted many visitors and produced a good revenue.

Bottle gourds fitted with tin tops have been most successfully used for storage of small quantities of seed.

Yams.—Thirteen varieties of dioscorea yams were planted. The yams will be dug early in 1923.

Manioc.—A comparative test was made between planting cuttings flat and erect. The results this year have not been conclusive.

Plantains.—Suckers of thirteen varieties collected in 1921 have grown well. Individual flowering and yield records are being kept.

Tomatoes.—Five hundred plants gave a yield of 1·15 lb. per plant. The crop was sold profitably. The plants made excellent growth.

Fibres.—Mauritius hemp has not done well, and there are many vacancies. Sisal has done rather better, but the growth compares very unfavourably with that at Anuradhapura or Peradeniya.

Green Manures.—Leucæna glauca was introduced on the station. The plant is found locally, but its uses are not known. The leaves are relished by goats. Growth has been fair, and the seed when available will be tried as a cattle food.

A selection of other green manures from the Experiment Station, Peradeniya, was sown. Of these, *Crotalaria striata* has made the best growth and promises well.

Distribution of Seeds and Plants.—The following quantities of seeds and plants were distributed:—

Cholam	176 lb.
Groundnuts	70 lb.
White Burley tobacco	3 lb. 10 oz.
Maize	16 lb.
Dhall	12 lb.
Guinea grass	2,100 sets
Tomatoes	525 seedlings

Experiment Station, Kanniyai, Trincomalee.

The main works carried out during the year have been (1) the completion of the irrigation arrangements with the assistance of the Irrigation Department, and (2) the removal of a large bank which ran almost across the station. The removal of this bank was a laborious and costly work.

A series of paddy manurial experiments was carried out on the same lines as those carried out on cultivators' lands. Results have been reported separately.

An area of pineapples was laid down and promises well. Plots of cotton, maize, sweet potatoes, and cholam were grown.

A central road was formed to be eventually linked up with the Government cart road.

The station is still in its infancy, but should be in a position to give some useful results in 1923.

T. H. HOLLAND,
Acting Divisional Agricultural Officer
(Northern Division).

AGRICULTURAL INSTRUCTORS CONTROLLED FROM HEAD OFFICE PENDING FURTHER DECENTRALIZATIONS.

Western Province.

The following extracts are taken from the report of Mr. A. B. Attygalle, Agricultural Instructor, Veyangoda :—

The chief work done during the year was in connection with paddy cultivation and other food crops. Special efforts were made to encourage green manuring, use of artificial manures, weeding of paddy fields, paddy transplanting, and to introduce improved ploughs to the district.

Paddy transplanting competition was organized for Uruwela peruwa during the last maha season and it was a success. The first prize (a pair of buffaloes and an English plough) was awarded by the Society and three money prizes and eight certificates were awarded by the Department of Agriculture.

Another paddy competition was organized for Alutkuru korale south during the last yala season. This competition too was a success, and there were about fifty competitors for this. Two money prizes and five certificates were awarded by the Department of Agriculture to the successful competitors.

Paddy Manuring Experiments.—A series of paddy manuring experiments are being conducted during this maha season at Alutgama in Siyane korale west, Pasyala in Siyane korale east, Minuwangoda in Alutkuru korale north, and at Hampitiyaya in Siyane korale east.

Lectures and Demonstrations were given to headmen, vel-vidanes, and cultivators specially on green manuring, weeding, paddy transplanting, and seed selection. Cultivators have realized the nature of green manuring, weeding, and paddy transplanting, and many cultivators use green manure now. Weeding and paddy transplanting too is practised to a certain extent, and in Hapitigam korale weeding and paddy transplanting is increasing. During this maha season not much of paddy transplanting had been done owing to the late season consequent upon the severe drought.

Growing of Vegetables and other Food Crops.—Efforts were made to encourage the growing of vegetables and other food crops. Seeds were distributed to poor villagers free of charge. The growing of vegetables and other food crops has increased to an appreciable extent in villages.

Anicuts and Tanks.—Several anicuts in Siyane korale west were temporarily repaired with the assistance of the vel-vidanes and cultivators. Arrangements are being made to improve two tanks in Siyane korale west as soon as the dry month sets in.

Co-operative Societies.—Efforts were made to organize Co-operative Societies. A society was organized for Galgamuwa Peruwa in Siyane korale west in December last.

School Gardens.—Lectures and demonstrations were given to school children, and an endeavour was made to introduce systematic work in school gardening.

North-Western Province.

The following extracts are taken from the report of Mr. K. S. Arumugam, Senior Agricultural Instructor, North-Western Province :—

School Gardens.—In this Province there are eighty-three school gardens, of which three were started during the year under review. A fresh life of activity was given to another two, which were neglected for a few years.

All these gardens, with the exception of ten, are neatly kept and cultivated with ornamental plants, fruits, vegetables and other food crops. In some gardens medicinal plants are also cultivated. Teachers and students of eight schools are taking great interest in paddy cultivation, though paddy fields are attached to only three of the above-mentioned school gardens, the rest have managed to lease out fields for demonstrating to the cultivators the value of manuring, weeding, and transplanting paddy.

Vegetable cultivation is much encouraged in the school gardens by the "Col. T. Y. Wright" Prize. Forty-four gardens competed for it during the last maha season.

The "F. N. Murray" Prize for the best kept home garden in the Chilaw District has created great activity among the students who are trying their best to get up good gardens for competition.

Ploughing Demonstration.—Ploughing with Meston plough was demonstrated at different centres of this Province during the months of May, June, early part of July, and November last. The principles of ploughing and the advantages of using a Meston or any other similar iron plough were fully explained to the cultivators.

Supply of Seed Paddy.—Owing to the partial failure of crops during the last three seasons consecutively there was a great scarcity of seed paddy during this maha season throughout this Province, especially in Chilaw District. The Agricultural Instructor of Chilaw and Puttalam Districts (Mr. A. C. W. Jayawardena) alone secured supplies of one thousand bushels of seed paddy to some cultivators of Chilaw District. Again some cultivators ordered their seed paddy from Anuradhapura District, while others purchased ordinary paddy and sowed them. Many fields yet remain unsown for want of seed paddy and buffaloes.

There are no proper organizations in this Province through which cultivators can indicate their wants and difficulties to get them supplied. Co-operative Societies are the most suitable bodies for this purpose, but they have not become very popular as yet. Want of enthusiastic workers is a great drawback.

Paddy Manurial Experiments.—These are being conducted at Battalagoda, Dambaliyadda, Narammala, Hettipola, Bandara Koswatta, Awligama, and at Chilaw.

Paddy Demonstration Plots are being cultivated at Medamulla, Gokarella, and at Ganewatta. Manurial and cultural experiments are being conducted by enthusiastic landowners at Pussela, Wattakapotha, and at Narukadawara, with a view to demonstrating to the cultivators the value of applying different kinds of manures, weeding, transplanting, and ploughing with iron ploughs.

Demonstration Garden, Dandagamuwa.—This garden is maintained in a good state, as usual, under Agricultural Instructor Mr. P. A. Gooneratne. Cultivation of vegetables, food and fodder crops, the value of manuring, mulching, rotation of crops, and seed selection are being demonstrated. Arrangements have been made to add another one acre to the present area.

Province of Sabaragamuwa.

The following extracts are from the report of Mr. A. Madanayake, Senior Agricultural Instructor, for the Province of Sabaragamuwa :—

Paddy Cultivation.—Improvement is visible in this direction. The attention of all Agricultural Instructors was directed mainly to paddy cultivation, as so far only a very few cultivators had realized the advantages of deep-ploughing, weeding, manuring, transplanting, and seed selection. If the Irrigation Rules under section 16 of Ordinance No. 23 of 1889 by the Government Agent, Province of Sabaragamuwa, were in full force, the present staff of Instructors would have found their task minimized, but this has not been so, and consequently preliminaries in paddy cultivation as set forth in the Ordinance, such as the repairing of all elas, drains, water-courses, and the clearing of wanatas (paddy field boundaries), &c., had to be seen to. With the help of school children several demonstrations in weeding were held in several centres. Manuring of paddy lands on systematic lines was never done here, except that small quantities of manure mixed with seed paddy are sown in places closer to railway stations. With a view to showing how manures should be applied, eight paddy manurial experiments were carried out in different centres in Nawadun korale, for which 1 ton 3 cwt. 1 gr. manures (steamed bone meal) were supplied by the Department free of charge to *bona fide* cultivators. The results of these experiments are not available yet, but the superior growth of paddy plants in their young stage has attracted the attention of many neighbouring cultivators, who have expressed their desire to indent for the same manures.

Five varieties of paddies of 2 bushels each, grown from selected grains by the Economic Botanist at the Dry Zone Experiment Station, Anuradhapura, were sown in close proximity to town. These varietal trials were carried out alongside with paddies of the same age, so that if better results are achieved the paddy may be introduced to remote areas. The growth of these paddies is satisfactory, and is being carefully watched, all records being kept.

Paddy Field Competitions.—Awards for competition fields started in Nawadun, Kukulu, and Kuruwiti korales, and the best buffalo-proof live fence in Kukulu korale, were made by the Chairman of the Food Production Committee.

Vegetable Garden Competitions were started in Atakalan, Kolonna, and Kadawata and Meda korales, but the competitions in the last two korales fell through owing to the small number of entries, and awards for Atakalan korale competition was made. As a consequence a large number of vegetable gardens sprung up. Arrangements are afoot for competitions in vegetable and paddy cultivation for 1923, rules governing which have been submitted to the Chairman, Food Committee.

School Gardens in Ratnapura District.—Fifty-three monetary awards accompanied by certificates were made to school children by the Department for best home gardens. There are over 1,000 home gardens worked now.

School Gardens in Colombo District.—The condition of school gardens in Colombo and Negombo Districts has improved immensely, and it is satisfactory to note the assistance given by the proper provision for water supplies and fencing. Twenty-four school gardens received awards.

Markets.—A Saturday market was established at Godakawela, and arrangements have been made for a Sunday market at Malwala.

Experiment Gardens.—Experiment gardens have been maintained in satisfactory condition by the Agricultural Instructors at Balangoda and Godakawela. At the latter station the trials with cinnamon and with citronella have been very encouraging. Trials have also been made with cotton, with promising results. The trials with vanilla have not been successful.

Eastern Province.

The following extracts are from the report of Mr. C. Canagaretnam, Senior Agricultural Instructor, Batticaloa District, of the Eastern Province :—

Coconuts.—*Nephantis Serinopa*, the leaf caterpillar on coconut, was very virulent, and more so on estates bordering the sea in South Batticaloa. The Pests Board and the Agricultural Department concentrated their attention in the combating of this pest. The Plant Pests Board received voluntary contributions from the public of Batticaloa, which enabled it to maintain a staff of four officers, after a training under the Senior Agricultural Instructor, to go about and educate people as to what steps should be taken in the minimizing and consequent eradication of this pest. They were stationed at Kalmunai, Akkarai pattu, Kalkudah, and Sengaladi. The Government Entomologist paid visits to examine the pest in its field conditions, and methods of control were decided upon. These measures included spraying, the introduction of parasites, and the cutting off and burning of affected fronds.

Paddy.—The sowing of mun-mari crops started rather late this year owing to the late rains. Experiments at Illupadichenai in Batticaloa North and Nindoor, Batticaloa South, of 1½ acre each, worked entirely on Government expense were undertaken this year to demonstrate (1) that extensive farming is more profitable, (2) that the present seed rate of 3½ to 3¾ bushels per acre is too high, (3) that weeding and manuring enhances the productivity of the land when compared with the present system adopted in the district of growing large areas of weeds and paddy. These two areas received the application of bone meal. Co-operative experiments are being conducted in cultivators' fields at Pullumallai, Buffalo Island, Sammanturai with fish manures and steamed animal meal.

School Gardens —There are twenty-four school gardens. The acreage of each garden varies from half to one acre. The crops that are cultivated are vegetables, paddy, fibrous crops as cotton, &c. Owing to teachers not possessing knowledge enough to conduct classes in the teaching of elementary lessons in agriculture to children, the Agricultural Instructors in their respective divisions are taking lessons once a week. A start has been made in the following schools :—Oddaimavadi, Eraur, and Arasadi. Experiments with paddy have also been undertaken with manuring and transplanting at Oluvill, Nindavur, and Eraur school gardens. Cambodia cotton is doing well in the school gardens at Oluvill, Irakamam, Eraur, and Arasadi.

Vegetables.—A large amount of vegetable seeds were distributed free through Revenue Officers and Agricultural Instructors. Seeds to the value of Rs. 1,300 were distributed to this district alone, and further demands could not be met owing to lack of funds. The total number of vegetable gardens that entered into competitions were eighty-three and fifteen prizes were awarded.

Fruits.—The Department secured twenty fruit plants for this district, including mango-grafts from India and pomegranates and oranges of good varieties. These were secured at the request of the public, who are anxious to effect some improvement of their fruit cultivations.

Province of Uva.

The following extracts are taken from the report of Mr. E. W. Dias Bandaranayaka, Senior Agricultural Instructor, Province of Uva :—

All efforts were directed during the year to introducing transplanting and manuring of paddy and improving chena and garden crops.

Competitions.—Prizes were offered to the seven divisions in this Province, two prizes of Rs. 15 and Rs. 10 for each division. The entries for these competitions were fairly satisfactory, Udukinda and Yatikinda taking the lead, Wiyaluwa following. It was regrettable to note that there had been no entries from Buttala and Wellawaya divisions, though transplanting was more easily adopted in these divisions than elsewhere. There is likely to be a decided increase in the number of transplanted fields in this Province for the coming year.

Paddy Manuring.—The application of green and cattle manure is also increasing. Cattle manure hitherto allowed to run waste is now being made use of whenever available. Practically all fields are cultivated once a year for maha, during the off season these fields get overgrown with nidukumba (*Mimosa pudica*), and it was the practice to remove these, but now they are buried with the ploughing, which serve as an excellent green manure.

Artificial manure was applied to fields within the gravets of Badulla. Green manure and ephosphosphate was found to give the best results. The application of green manure to fields have a decided increase in yield. An experiment is being carried on with artificial manure (bone meal) at Bibile.

Chena Crops.—The cultivation of manioc in chenas is increasing towards Bintenne and Wellassa, all available cuttings were utilized during this season, and almost all chenas have been planted up with manioc. In Udukinda, Wiyaluwa, and Yatikinda more of kurakkan, maize, beans, &c., are found growing, and towards Wellawaya a good deal of chillies are planted with maize, &c., in the chenas.

Cotton.—This is likely to become a promising crop in this Province. Seeds were obtained from the Department and distributed to different people living in various parts of the Province. Cotton grown at Wellawaya and Tanamalwila are growing well. Those planted at Bibile, Taldena, Meegahakiule, Buttala, &c., are also showing progress. In Bintenne and Wellassa divisions cotton seed was distributed to places like Medagama, Pitakumbura, Dambagalla, Uraniya, and Alutnuwara.

Tobacco.—Tobacco grown at Bibile Gardens have been transplanted and they have taken root, and a good crop is expected. Chewing tobacco is being tried at Taldena, this would find a ready market. In the Moneragala district, too, tobacco is being tried by a private individual.

Sugar cane.—As the cane grown at Haldummulla was found to be deteriorating, it was decided to introduce a new variety of cane into this locality. The different varieties of cane supplied by the Department are now being tried at Haldummulla, they are showing signs of good growth. Half an acre has been planted up in the Bibile Gardens, the rains fell in good time to allow the tops to take root. Almost all the tops have germinated.

If the people cultivating sugar cane could be shown a method of producing crystalized sugar by some cheap and easy method, there is no doubt of the area under sugar cane round about Haldummulla increasing.

School Gardens.—During the course of the year all the gardens in the Province were visited, inspected by me, and awards given according to the work done by different teachers. Special attention will be paid to encourage home gardens, as the children were found to have slackened off slightly. Implements and fruit trees have been supplied to many of the schools, this I am sure would encourage the teachers more and make them do better work.

Experiment Garden, Bibile.

A good deal of time and energy has been spent by the Agricultural Instructor, Bibile, on developing the Experiment Garden there. A watcher's hut has been put up, and a live stick fence round the garden to protect crops from wild animals, &c. The land has been divided into half-acre blocks. The crops at present standing are sugar cane, cotton, tobacco, and manioc. The site of the garden is quite good, being on the main road.

VII.—THE WORKING OF CO-OPERATIVE SOCIETIES, 1922.

THE working of the societies was given considerable attention by the co-operative staff of officers of the Department during the year. Many old societies were visited and their working was revised. A number of new societies was formed. Many a society was able during the year to recover its overdue loans, and the business capacity considerably increased. The number of unsatisfactory societies is reduced, but there are as yet societies which require better attention and supervision by their respective office bearers. The working capital has increased, and the financial position has been somewhat easy, but many societies have not yet come up to their full working capacity. An attempt is being made to help the artizans and to revive home industries. Business in the supply of manures for paddy and other crops has fallen owing to high prices of manures. Some societies found difficulty in meeting manure bills when due, and this action has necessitated a more cautious policy to be adopted. The co-operative movement is being kept before the notice of the general public, and it is evident that the general public have begun to acknowledge co-operative societies as a medium for the improvement of economic condition of the rural population.

PROGRESS.

Societies.—The number of societies registered during the year is 34, and the number of societies of which registration was cancelled is 1. There were 198 societies in the list at the end of the year, showing an increase of 33 societies for the year.

Members.—The membership has increased by 2,028, and the total number of members at the end of the year is 21,518.

Capital.—The increase in the amount of paid-up capital was satisfactory, showing a total of Rs. 172,504, an increase of Rs. 46,783 over last year.

Deposits.—The deposits have not increased very much during the year. The balance to the credit of deposits at the end of the year stands at Rs. 31,169·93.

Reserve Funds.—The reserve funds have increased by Rs. 4,534·20. The total amount to the credit of the reserve funds is now Rs. 25,057·17.

Loans.—The business in loans has also increased during the year. Rs. 210,138·31 have been given on loans, and Rs. 138,959·31 have been recovered. A balance of Rs. 247,385·05 was outstanding at the end of the year.

Central Province.

Mr. G. G. Auchinleck, the Assistant Registrar, reports as follows in regard to societies in the Central Division :—

The general outlines of this work are fairly well understood by villagers, and it is probable that the time has arrived for further development. Initial propaganda work carried out in former years has been effective. It appears probable that the movement will have to be extended to lines other than money-lending if development is desired. There are the following societies in the division :—

Kandy ..	.. 20	Nuwara Eliya ..	.. 2
Matale ..	.. 4	Kegalla ..	.. 6

Repayment of loans is lax in societies of this division. In three or four cases it has been recommended that the societies be closed down.

In several cases it will be found necessary to narrow the area of operations of societies ; a Ratemahatmaya's division is too large an area for one society.

Four new societies have been registered in the Central Province during the year. Three of the new societies have started work, and the other was registered at the close of the year. All the four societies are from the Kandy District. Some of the old societies in the Kandy District have been revived, and a few as yet remain dormant. Three societies received loans from Government, and one out of the rice profit funds. The Kitulgala, Ruanwella, and Kanduaha Pattu Societies in the Kegalla District of the Province of Sabaragamuwa are making progress.

Southern Province.

Mr. F. Burnett, Assistant Registrar, Southern Division, reports as follows :—

The progress of the working of the co-operative societies in the Southern Division for the year 1922 has been satisfactory on the whole. There are sixty-eight societies in the division, six of which are new societies pending registration. While some of these societies are proving to be a good success, there are others that only mark time, almost stagnating, with little or no progress. Most of the latter class are, however, steadily improving as a result of closer supervision and constant backing up of the management. Experience has so far shown that the efficient working of a society depends to a great extent on the President and the Secretary of that society. The Presidentship of most of the societies in the division is held by the Chief Headmen, and a greater number of such societies have considerable room for improvement, though, again, some are doing excellent work ; but that improvement could be realized only if Mudaliyars take a really keen interest in the working of these societies. Though some of the best working societies in the division, such as Matara Wesleyan Mission, Hambantota Government Servants', Handapangoda, Alutgama, Yatiyana, and Heenatigala, are without the Presidentship of the Chief Headmen, there are societies, viz., Weligam korale, Kevitiagala, Matara Gangaboda pattu, Kandaboda pattu, Panadura-Talpitibadda, Mahagama, Ittapana, Akmeemana, that bring credit to the Mudaliyars and show what their leadership is worth.

The non-payment of loans on due dates, irregularity of the meeting of managing bodies, have been the other main causes for the presence of slow progressing societies in the division ; also there have been cases where more than one society has suffered, due to the office bearers allowing their private differences to interfere in the working of a society.

Manure Distribution.—The distribution of manure among the members this year has been rather unsatisfactory, because many societies failed to settle their previous bills with the manure firms. Almost all the manure used has been for the cultivation of paddy.

Paddy Cultivation and other Foodstuffs.—Some societies have been instrumental in the encouragement of better methods of paddy cultivation, by entering into competitions, offering awards, &c. Weligam Korale Co-operative Society had the distinct honour of winning the "Brito Babapulle Gold Medal," competing with all the societies in the Island. Matara Gangaboda pattu carried out successfully a transplanting competition among its members. The paddy store of Kevitiagala Society is considerably catering to the wants and convenience of its goiya members. The plot of land leased out by the Handapangoda Society from the Crown is bringing in a small income to the society. A considerable amount of vegetable seeds was distributed during the year among the societies. Mahagama Society is carrying on an experiment on green manuring of paddy, whilst Alutgama Society takes particular interest in the agricultural pursuits of its members ; so is Heenetigala Society.

Industries.—Galle Gangaboda Pattu Society has sent a boy student from the village to the Rajagiriya Weaving Mills on a scholarship to learn weaving. On his return he will train more others in the village in the art. The scholarship allowance is met out of the bonuses earned and credited to members as deposits.

Store Societies.—Of these, there is only one in the division, *i.e.*, the Hambantota Government Servants' Society. Managed by willing and enthusiastic active office bearers, this society is doing excellent work in its store department, much to the chagrin of the local boutique keeper. With a little more attention for the prompt repayment of the loans by the members, the society will do much better.

Northern Province.

Mr. T. H. Holland, Acting Assistant Registrar, Northern Division, reports as follows :—

Administration.—The post of the Tamil Inspector of Co-operative Societies remained vacant after the untimely death of the late Inspector, Mr. A. M. Muttukumaru, in April.

Mr. W. P. A. Cooke acted as Assistant Registrar during the absence on sick leave of Mr. N. Marshall, the Assistant Registrar, and after the latter's departure for England on August 16. The news of Mr. N. Marshall's subsequent death in England was received with deep regret in December.

Mr. T. H. Holland took over duties as Assistant Registrar on December 4.

"*Brito Babapulle Gold Medal.*"—The gold medal offered by Dr. C. Brito Babapulle for paddy cultivation by members of co-operative societies was allotted this year to the Northern Province. Twenty nine entries were received, but these were all from six societies, and it is regretted that not more societies were represented.

The number of societies in the Northern Division at the end of 1922 was twenty-four. One new society, the Talaimannar Co-operative Society, was registered during the year. The registration of the Anaikoddai Co-operative Society was cancelled.

Six of these societies, viz., Chavakachcheri, Kudatanai, Jaffna, Central, Pulmodai, Tiriyai, and Kuchaveli, did no work during the year. The number of members at the end of the year was 2,105. The paid-up capital was Rs. 31,250·80. The deposits were Rs. 11,351·19. Loans to the value of Rs. 59,191·41 were given out. The amount due to the reserve fund was Rs. 4,815·93. Government loan amounted to Rs. 4,860.

N.B.—The above figures are for the Northern Division, excluding the Sinhalese societies in the North-Central Province, but including the Vavuniya South Sinhalese Division. If figures for the Northern Province are desired, the following figures, which belong to the Trincomalee District Co-operative Society, must be deducted:—

Number of members 442. Paid-up capital Rs. 4,647·50. Loans given Rs. 17,720. Deposits Rs. 1,042·79. Due for reserve fund Rs. 740·12. Figures for the Kuchaveli, Tiriyai, and Pulmodai Societies have not been included, as they are not available.

It is believed that these societies have never done any work.

WESTERN PROVINCE.

One new society has been registered during the year, and the number of societies is fifty-one. The new society is one formed among the employees of the Colombo Safety Matches Manufactory, with the moral and generous financial support of the company, for the benefit of its employees, who have already realized its usefulness. The progress of the societies in the Colombo District is maintained, and in some instances is considerably improved. The Colombo District should be in a better position with regard to the working of the co-operative societies. There are twenty-one societies in the Colombo District and thirty in the Kalutara District. (This district is now under the Assistant Registrar, Southern Division.)

NORTH-WESTERN PROVINCE.

Four new societies have been registered during the year, bringing the total number of societies to eight: three in the Kurunegala District, two more than the last year; three in the Chilaw District; and two in the District of Puttalam. The new society in the Puttalam District, viz., the Demala Hatpattu Society, was formed in accordance with a resolution passed by the Puttalam Society with the bulk of the members of the Puttalam Society residing in the Demala hatpattu who were allowed to withdraw from it. Weuda, Nainamadama, and Hiripitiya are the other three new societies. There is considerable scope for the expansion of the movement in the Province.

EASTERN PROVINCE.

This Province has shown considerable interest in the matter of co-operation. The number of new societies registered within the year is twenty-two, all of which are from the Batticaloa District. There are thirty-six societies in the Province. Four are in the Trincomalee District and thirty-two in the Batticaloa District. These societies are the outcome of the interest taken by the Government Agent of the Province in the welfare of its agricultural and industrial population. Many of the societies are doing good work. The Trincomalee Society has increased its paid-up capital and its general usefulness, and is continuing to make very satisfactory progress.

NORTH-CENTRAL PROVINCE.

The number of societies is nine, one more than last year, and three of these have not started work. One of these will be cancelled. Four societies have made considerable progress, the other is a new society.

PROVINCE OF UVA.

Of the seven societies, four continue to do good work, one is bad, and two have made hardly any progress. Two of the Wellassa societies received loans from Government. Uva and Wiyaluwa societies are in need of good office-bearers. Wellawaya Society will be wound up.

PROVINCE OF SABARAGAMUWA.

There are five societies in the Ratnapura District. Of these, the Godakawela and Kahawatta societies are making progress. (Societies in the Kegalla District are under the Assistant Registrar, Centra Division.)

INSPECTION OF SOCIETIES.

The inspection and supervision of societies have been carried out in the respective divisions by the respective officers, viz., the societies in the Southern Province and the Kalutara District, by the Assistant Registrar, Southern Divison, and the Inspector stationed at Galle; the societies in the Central Province and the Kegalla District by the Assistant Registrar, Central Division, and the Inspector stationed at Peradeniya; and the societies in the Northern Province and the District of Trincomalee by the Assistant Registrar, Northern Division, and the Tamil Inspector. The Secretary, Board of Control, inspected the societies in the Colombo and the Ratnapura Districts, and in the Uva, North-Western, and North-Central Province. The Registrar visited some of the societies in the Eastern, Southern, and Western Provinces.

FINANCIAL ASSISTANCE FROM GOVERNMENT.

Loans from Government were given to ten societies, and the loan given to one society was returned. Another society, Galboda-Kinigoda Korale Society, paid and settled the loan before the expiration of the period, as the work of the society was not satisfactory, and the loan was re-called. The total amount lent during the year was Rs. 11,960, and the amount repaid Rs. 4,203·84. The balance outstanding at the end of the year is Rs. 32,004·48.

Supply of Manures and Implements.

There was a fall in the quantity of manures supplied during the year, and in the number of societies. A few societies received supplies of mamoties and barbed wire. The following statement will show the manure supplied and the cost to societies during the year :—

	Quantity.					Cost.	
	Tons	cwt.	qr.	lb.		Rs.	c.
1922	78	6	0	0	..	11,234	30

Supplies of Provisions, &c.

The Hambantota Government Servants' Society and the Department of Agriculture Society continue to supply provisions and other necessary commodities to members. The Colombo Buddhist School Teachers' Society, started at the end of last year, started supplying school books to pupils on easy terms with advantage to pupils as well as the society. Books to the value of several thousands of rupees were supplied during the year.

Supply of Paddy.

The Colomboturai-Poonakari Society, Kevitiagala Society, Urubokka Society, and the Handapangoda Society supply paddy to members. The first-named society has increased its business to such an extent that it was considered that a separate branch society was necessary for the work.

Food Production.

All rural societies give closer attention to the growing of food crops, and most of the loans given to members are for this purpose. The societies in Wellassa, Anuradhapura, and the majority of societies in Batticaloa are devoting their attention solely to agricultural work. The Uruwela Peruwa Society, through the generosity of its President, awarded an appropriate prize for the cultivator who obtained the best yield in paddy cultivation:—a plough and a pair of buffaloes. The Weligam Korale Society held an agricultural show, which was opened by the Registrar of Co-operative Societies. The Matara Gangaboda Pattu Society continue to take a keen interest in the improvement of the paddy cultivation.

The gold medal offered by Dr. C. Brito Babapulle was this year offered for competition among the co-operative societies members in the Northern Province, and several societies have taken part in the competition.

Home Industries.

In addition to the societies already mentioned in the report of the last year, a number of new societies have been registered for helping the industries. Several societies for weavers have been started in Batticaloa. The Karaveddi and the Tholpuram-Moolai societies in Jaffna are interesting themselves in the inauguration of weaving societies. The Galle Gangaboda Pattu Society has undertaken to train a member in weaving at the expense of the members out of the profits distributed to them.

Social Service.

The Kandy Rickshaw Men's Society was able to show practical benefits of a co-operative society among such a class of people during the year. It is customary for the rickshaw men to hire their rickshaws. Rickshaw men have no opportunity of securing sufficient capital wherewith to purchase their rickshaws. The society purchased a rickshaw and supplied it to one of its members, and the daily payment as hire were taken as payments against the value of the rickshaw, and at the end of the year he was able to pay its full value and owned the rickshaw for himself. This was an experiment, and it was a success. The Social Service Leagues could assist in purchase schemes by part payments of a similar character.

Co-operative Conferences.

Conferences of representatives of co-operative societies were held at the following centres during the year :—Kandy, Colombo, Panadure, Matugama, Galle, and Matara. Matters of importance to co-operative societies and their workers were discussed, resolutions were passed, and views were exchanged for the benefit of the co-operative movement. The Registrar presided at Kandy and Colombo centres.

Co-operative Education.

Training classes for the training of Secretaries, Treasurers, and other honorary workers were again held this year at Kandy, Colombo, Panadure, Matugama, Galle, and Matara.

One hundred societies sent in 247 representatives. Members of the general public also attended the classes. A large number of minor headmen took the opportunity to attend the classes at most of the centres. The Government Agents, or the Assistant Government Agents, and Assistant Registrars rendered assistance to make the classes a success. The Secretary, Board of Control, conducted the classes, assisted by the Inspectors. Several Chief Headmen of the various centres rendered assistance.

As usual, the students at the School of Tropical Agriculture, Peradeniya, were given lectures on co-operation, and the first annual prize for co-operation was awarded during the year.

The vernacular magazines published by the Department of Agriculture generally publish matters on co-operation, and these were supplied to societies free of cost.

The demand for leaflets on co-operation was greater this year, and to meet this demand further supplies had to be obtained.

A series of the Registrar's circulars were inaugurated, and four circulars on the following subjects were issued in English, Sinhalese, and Tamil to the Societies :—" Deposits and Withdrawal of Funds in Post Office Savings Bank "; " Custody of Funds "; " Supply of Manures "; and " The First Defalcation."

N. WICKRAMARATNE,
Secretary, Board of Control.

IX.—REPORT OF THE WORK OF BOTANIC GARDENS.

ROYAL BOTANIC GARDENS, PERADENIYA.

IMPROVEMENTS AND ROUTINE.

THE general condition of the Gardens has been well maintained. Several improvements have been affected during the year, either of a routine or permanent nature.

H. R. H. Prince of Wales's Visit.—Special attention was given in the early part of the year to the thorough cleaning up of the river banks, arboretum, lawns, &c., and to the overhauling of all the roads and walks, the renewal of labels and notice boards, painting of seats, &c.

These formed part of a general scheme of improvements and decorations preparatory to the visit of H. R. H. the Prince of Wales on March 24, and also included a special pandal designed by a Ceylonese member of the Department and erected over the main entrance.

The central drive, &c., was decorated with the flags of different countries, and over 1,000 arched bamboos draped with young coconut leaves lined the route from the entrance to the Peradeniya Railway Station and to the School of Agriculture on the Kandy side. The Great Circle was surrounded by some 140 planed posts and roped in so as to accommodate, in their respective sections, the boy scouts, school children, labour staffs of the Gardens and Experiment Station, and others.

A special enclosure was erected around a spot on the east side of the Great Circle, where His Royal Highness planted a young plant of the "muna-mal" tree (*Mimusops Elengi*) in memory of his visit, being presented with a silver mamoty with an ebony handle for the purpose.

Improvements.—The remnants of three old clumps of Giant Bamboo (*Dendrocalamus giganteus*), which had become exhausted from periodical flowering and become unsightly, were entirely dug out and removed,—an arduous task involving much labour.

A commencement was made in October to improve the vicinity of the gravel pit at the north end of the Gardens, by reducing the hillock of cabook rock bordering the drive on the west side and filling in hollows with the material removed.

Fernery.—Part of the soil obtained in the process of the latter work has been carted to the fernery, where improvements and an extension are in progress.

A narrow border has been built up round the Store building for the purpose of growing plants adapted to a dry locality, as Gerbera, Geraniums, &c.

CULTIVATION, PLANTING, &C.

Arboretum.—Progress in the cultivation and planting of the arboretum has been continued. Several more superfluous trees have been removed to make room for more important species.

Palmetum.—The palms in the newer portion, planted in 1914, are making excellent progress. The collection has been increased by five more species.

Pinetum.—This is filling up well, most of the young trees making rapid growth. Several more species of Coniferæ, sent from Hakgala Gardens, have been added to the collection.

One of the first Rain-trees (*Pithecolobium Saman*) introduced into Ceylon, near the nursery, has died from old age. Planted in 1851, it was 71 years old.

The *Flower garden* has, as usual, presented a satisfactory appearance during the greater part of the year, and been a centre of attraction to visitors. Some additions have been made to the collection, including selected varieties of Lantana received from Hakgala Gardens.

The two trees of *Ficus elastica*, near the plant houses, which have long been a striking feature, owing to their enormous buttressed roots which spread over the ground for a considerable distance, are gradually crumbling away. A large limb of the one nearest the drive came crashing down lately in calm weather. The fine specimen of *Ficus altissima* across the drive, near the laboratory, has recently shown signs of rapid decay in the top branches. A large tree of *Ficus Benjaminnii* on the north side of the Monument drive, has, owing to overcrowding, been cut down and removed.

NURSERIES.

The nursery work continues to increase, and stocks have been considerably augmented or renewed. The work is, however, much hampered by the present inefficient water supply.

The supplementary nursery on the river bank close by has been extended, and stocked chiefly with young palms, hedge plants, &c.

A new and spacious potting and packing shed, consisting of iron framework (formerly the property of the Stock Garden) set in concrete, with cadjan roof, has been erected. This provides a much-needed accommodation.

FRUIT AND SEED CROPS.

The Brazil nut tree, now 40 years old, ripened a number of fruits in November, from which about a thousand seeds have been obtained. These have been sown, and it is hoped a good number of plants will be raised.

NOTES OF BOTANICAL INTEREST.

An event of unusual occurrence is the flowering simultaneously of eight talipot palms (*Corypha umbraculifera*), the remainder of the talipot avenue planted in 1882. These remarkable inflorescenses first appeared early in June in the form of an erect pole from the centre of each palm, afterwards branching and forming an immense panicle, attaining maximum development at the end of the year and a height of about 27 feet from the crown of the palm. The countless creamy-white scented flowers are followed by the large marble-like fruits, which take about eight or nine months to ripen, the palm afterwards dying.

Maximilliana regia, the "Inaja" of the Amazon region, and one of the most handsome of palms, has flowered freely this year and set a few fruits for the first time. *Veitchia Johannis*, a palm introduced in 1914, also fruited for the first time.

Guaicum officinale, the Lignum-vitæ tree of the West Indies, has been growing here since 1882, but not flowered until this year. The pale blue flowers were produced in April and May, and ripe seeds, from which plants have been raised, in October. In the former Botanic Gardens at Anuradhapura this interesting small tree fruited freely, the drier climate evidently suiting it better than the wetter one of Peradeniya.

Monodora tenuifolia, a small tree of West Tropical Africa, with peculiar orchid-like flowers, introduced in 1897, set a few fruits for the first time as a result of artificial pollination, and from these a few seedlings have been raised.

Notes of Economic Interest.

Taraktogenos Kurzii, a tree of Burma, which yields chaulmoogra oil, valued in the treatment of leprosy, &c., has been established in the arboretum, where two plants were planted in 1921.

A small consignment of patchouly plants (*Pogostemon Patchouli*) was obtained in a wardian case from the Singapore Botanic Gardens for Dr. W. A. de Silva, the plants being re-established at Peradeniya.

Okari-nut (*Terminalia Okari*).—Three good plants raised from seeds received from Papua, through Mr. C. F. Hutchinson, in 1921, have been planted out in the Gardens, and have the appearance of becoming handsome, quick-growing trees. The large edible seeds are known as Okari-nut in Papua, where they are highly relished, being considered "one of the finest of tropical nuts."

Plant Introduction.

Exchanges have been carried on and a few purchases made. The latter included a collection of roses and other plants from Messrs. Brunning's Nurseries, Melbourne, and a collection of orchids from Messrs. Kkon & Co., Burma.

The following are the principal introductions or re-introductions for the year :—

Anona deversifolia (Fruit edible)	Department of Agriculture, United States of America
Astragalus sinicus (Green manure plant)	Yokohama Nursery Co., Japan
Artocarpus sp. (Bread-nut)	Divisional Agricultural Officer, Galle
Balanocarpus maximus (Standard timber of Malay)	Forest Department, Perak, Federated Malay States
Cassia Beariana (Specific for dysentery)	Royal Botanic Gardens, Kew
Celtis australis	Department of Agriculture, Malta
Celtis rhamnifolia	Danish Consulate, Cape Town
Cupressus fastigiata	Department of Agriculture, Malta
Dasylirion gracile	Brunning's Nursery, Australia
Dasylirion longifolium	Brunning's Nursery, Australia
Dodonæa thumbergiana	National Botanic Gardens, Kirstenbosch, South Africa
Doryanthes excelsa	Brunning's Nursery, Australia
Dendrocalamus sikkimensis	Lloyd Botanic Gardens, Darjeeling
Feijoa sellowiana	Brunning's Nursery, Australia
Ginkgo biloba (Maiden-hair tree)	Mr. G. Vasilieff, Tientsin
Goldfussia anisophylla	Brunning's Nursery, Australia
Iochroma tubulosa	Brunning's Nursery, Australia
Juneperus procera	Arnold Arboretum, Harward University, United States of America
Kerria japonica	Brunning's Nursery, Australia
Musa sp.	Colonial Botanic Gardens, Laekin, Belgium
Pistacea terebinthus	Department of Agriculture, Malta
Rhapiolepis ovata	Brunning's Nursery, Australia
Rhus lancea	Danish Consulate, Cape Town
Sparmannia africana	Danish Consulate, Cape Town
Widdringtonia dragomontana	Danish Consulate, Cape Town

The Economic Museum.

Several contributions have been made to the collections, and old specimens replaced where possible.

The renewal of defaced or discoloured labels, owing to the effects of insects and climate, requires constant attention, and is difficult to cope with.

Miscellaneous.

The Curator, Mr. Parsons, continued to give practical demonstrations in horticulture to the students of the School of Tropical Agriculture, and the Superintendent of Botanic Gardens conducted examinations in horticulture. The Curator also planned and supervised the laying out of grounds at the new mycological and entomological laboratories and the three new Government bungalows.

A lecture on Hevea budding was given by the Curator before the Sabaragamuwa District Planters' Association in April.

The Superintendent of Botanic Gardens assisted in the publication of a centenary account of Peradeniya Gardens, published to commemorate the visit of H. R. H. the Prince of Wales in March ; also submitted reports on the improvement and maintenance of railway station gardens ; the improvement of street trees, parks, gardens, and recreation spaces, &c., in Colombo ; the laying out of the grounds at the new ward and sisters' quarters at the Kandy hospital ; the improvement of the Naval Camp at Diyatalawa ; and notes on patch budding of Hevea.

The Superintendent also judged at the Weligama Agri-Industrial Show, attended committee meetings of the Gampaha forthcoming show, revised the catalogue for the latter, and submitted notes on Cannas.

Visitors.

The number of visitors to the Gardens is increasing, though still short of pre-war numbers. The visitors' book kept at the Lodge was signed by 2,834 visitors, mostly from abroad. These included H. R. H. the Prince of Wales and party ; Lord Willingdon, Governor of Madras, with Lady Willingdon and party ; the Marquis and Marchioness of Bute ; H. E. Admiral Sir L. and Lady Clinton Baker ; Mr. G. T. Lane, Curator of the Royal Botanic Gardens, Calcutta ; and Mr. Delevoy, Forest Officer, Congo.

The following is the report of the Curator, Mr. T. H Parsons :—

"The routine work of the Gardens has been satisfactorily carried on, and includes the periodical forking and manuring, planting and watering of Main Central drive and Lake road borders, specimen beds in Lake and Monument roads, flower garden, fruit plots, and in the general upkeep of the Gardens in the direction of grass cutting throughout all sections, road weeding, sweeping, in the potting and cultivation of plants in the plant houses, and in hedge trimming. The weeding of the fodder plots has now to be included among the routine operations.

NURSERIES.

"Further improvements in the construction and opening up of the nurseries have been carried out in the erection of a permanant plant shed in ornamental nursery, consisting of a light iron framework, on a concrete foundation, and roofed with cadjans, and the removal of the old sheds and general straightening out of paths and roads consequent to their removal. The new shed affords ample facilities for all nursery operations demanding cover, such as packing, despatching, seed sowing, &c.

"The lower nursery below ornamental nursery has been improved and enlarged by the removal of the old Giant Bamboo stump, and by the section of river bank near cooly lines, given over to line coolies for cultivation during food shortage period, being taken back into cultivation again in consequence of the section being allowed to run wild. This reopened area was utilized to raise the large stocks of hedge plants, &c., required around new bungalow compounds and around the new laboratories.

"The old vegetable plot behind palmyra avenue has been allotted to the purpose of raising all stock requirements for school gardens ; the existing vegetable plants and roots having been transferred to a section of the economic nursery.

ROADS.

"The general condition of the roads and paths throughout the gardens had considerably deteriorated, and efforts were made in the early part of the year to bring these into order prior to the visit of H. R. H. the Prince of Wales on March 24. The whole of the drives through the centre of Gardens were re-gravelled and the greater portion of river drives and South Garden, paths of the flower garden, and arboretum, were also re-gravelled and shaped. Culverts throughout the gardens have been overhauled, and in most cases re-built, and many of the side drains re-shaped.

RIVER BANKS.

"Further small sections of the river bank were cleaned and planted up with fodder grasses, notably in the South Garden section, near the pond, this section becoming available by the removal of another old clump of the giant bamboo. The section below Gardener's Memorial was considerably improved by shaping and turfing. Many plants of Ceylon timber trees were planted during the year on the river banks bordering the arboretum and River drive, and comprised chiefly nadun, hora, dun, kekuna, and calamander.

PINETUM.

"The contents of the pinetum have been augmented by further plantings. This year's plantings include *Cupressus torulosa, C. sempervirens (fastigiata), C. macrocarpa, C. Knightiana, Thuja orientalis, Juniperus Bermudiana, Frenela rhomboidea, Pinus longifolia, Sequoia gigantea, Podocarpus cupressina,* and *Araucaria Cookii.*

"The new additions made since the development and enlargement of the pinetum last year now comprise 10 genera and 24 species. All the new plants are thriving remarkably well, due no doubt to extra large holes being prepared and dynamited, and to the favourable growing conditions experienced throughout the year.

ARBORETUM.

"The thorough overhauling of the arboretum sections, commenced in section B last year, was continued by the removal of many superfluous trees of sapu, mango, and ficus from sections A, D, and F. Much still remains to be cut out, and progress in this direction is being continued.

"New plantings made during the year include plants of the current year's introductions or reintroductions, together with successfully raised seedlings of introduced seed of 1921 and 1922, totalling in all 140 plants distributed over 28 natural orders. Plants successfully established and of particular interest are as follows :—*Calophyllum Calaba, Carapa procera, Celtis australis, Gleditschia amorphoides, Guettarda uruguayensis, Luehea divaricata, Myrrhinium atropurpureum, Pouteria suavis, Ruprechtia salicifolia, Taraktogenos Kurzii, Tristania conferta.*

"The upkeep of the arboretum collections include manuring, fencing, shading, watering, and call for increasing labour and supervision annually.

PALMETUM.

"The collections of palms in palmetum were augmented by the following additions : *Calamus radiata, C. rudentum, Calyptrogyne Ghiesbrechtiana, Caryota Rumphiana, Mauritia setigera,* and *Roscheria melanchætes.* This increases the collection by 2 genera and 5 species, the total contents now being 70 genera and 143 species, the majority of the species being planted in duplicate. With the further transfer to, or replacement, in the arboretum of the types of tree in the near vicinity of the palm groups, space becomes available for group extensions. The palms continue to grow well, which will necessitate in the near future the removal of such duplicates can be spared.

Pond.

"The establishment of the white variety of *Nelumbium speciosum* in the South Garden pond has been attained by fencing off a section of the pond with wire netting. This has also resulted in protection to the Giant Water Lily (*Victoria regia*) from attacks by Gourami, and to some degree the destructive water tortoise. A Gourami fish measuring 23 inches from nose to end of tail, a girth in the thickest part of 18½ inches, and weighing 7¼ lb., was found floating in the lake and almost dead on April 24. It was sent at once to Colombo Museum for record purposes, but by the time it arrived putrification had too far advanced to admit of an examination being made.

"Five average-sized Gourami were caught and despatched to Mr. J. P. Obeysekera of Veyangoda, and three good-sized Gourami were caught and transported to Mr. J. P. William of Henaratgoda, during the year.

Water Service.

"The garden water service within the Gardens has been rendered more efficient by the raising and cleaning of the majority of the pipes and by the fixing of twenty new taps. By a transfer of piping from Monument road and utilizing these to form a new branch from Main drive (at junction of Trimen's drive) to flower garden, an additional two standpipes have been erected, thus relieving a long felt want at the north end of flower garden.

New Improvements.

"*New Bungalow Compounds.*—Plans in connection with the laying out of the compounds of the new Government bungalows, Entomological and Mycological Laboratories, Peradeniya, were submitted to Director of Agriculture during February. Work in this connection commenced on May 15 and was completed end of October, and included the levelling, turfing, hedging, definition of roads, and preparing and planting up of beds and borders.

"The frontage of the whole area was defined by one long sloping bank 3 feet in height and 360 yards in length, the bank having a base of 12 feet and summit of 2 feet 6 inches, along which Hibiscus hedging was planted.

"*Fernery.*—A clearance of the three sections of the fernery adjoining Main and Trimen's drive, and bordering the inner sections, overhauled and opened up in 1916, was commenced in September and is still in progress. Additional paths are being opened up, and much soil is being carted to fill depressions and form beds. Each of these sections will on completion be planted up on similar lines to the centre of fernery area. Advantage was taken at the same time of reserving and preparing a small section adjoining the Ceylon indigenous fern collection for purposes of extension of this collection.

"*Old Gravel-pit Area.*—A commencement was made in October to improve this section of the Gardens by the removal of the natural hillock near present gravel pit, and a general levelling of the surrounding area in accordance with a decision given some years previously. Progress in the work is being made as fast as funds permit, the soil being removed to fill depressions in fernery sections and in building up the river bank at the sharp bend in River drive near ferry, with the object of straightening out the River drive road at that point.

General.

"The row of *Cassia multijuga* trees interplanted with *Brownea grandiceps* in Trimen's drive having become much overgrown and unshapely have been cut back hard. The original avenue of *Brownea grandiceps* was planted in 1900 and interplanted with *Cassia multijuga* in 1904 for the purpose of affording shade to the former and to encourage a more rapid growth. Many of the trees now appear to be dying, due apparently to the large trees overhanging this avenue, and many gaps are perceptible.

"Two fruits of the double coconut palm (*Lodoicea sechellarum*) which ripened at Henaratgoda Garden, were planted in the vacancies of the present avenue on April 10. One more seed or plant is required to complete this avenue.

Rainfall.

"The following is the rainfall for the year, showing the average per month for the past thirty-nine years. The highest rainfall in any 24 hours was 3·05 on December 5–6.

Month.	Rainfall for 1922.		Average from 1884 to 1922, Inclusive.	
	Inches.	Days.	Inches.	Days.
January	1·21	5	3·67	6
February	5·25	6	1·64	3
March	2·48	4	4·62	7
April	6·84	8	8·41	12
May	3·56	10	5·86	11
June	11·11	22	11·03	17
July	10·00	16	8·35	18
August	5·89	19	6·04	13
September	6·91	15	6·73	15
October	14·05	20	13·55	18
November	11·92	21	10·45	16
December	6·19	5	8·50	12
Total	85·41	151	88·85	148."

HENARATGODA GARDEN.

The general condition of the Garden has been well maintained, though, as usual, it suffered in periods of dry weather from the want of a water supply.

Selected Coconuts.—The low-lying portion at the south end of the Garden having been largely filled up by earth obtained in the vicinity, a portion of the area was planted with seven varieties of coconut received from the Peradeniya Experiment Station, but the ground was under flood in November for nearly a fortnight, which resulted in the death of many of the coconut seedlings.

Pineapples.—A portion of the reclaimed ground referred to in the preceding paragraph was planted with varieties of pineapple, which so far are not making good progress.

Mangoes.—A plot has been set apart to the east of the lawn for the cultivation of selected mango varieties, chiefly for the purpose of propagation and maintain good stock. Twelve named grafted varieties, imported from India through the Central Seed Store, were received and planted in April. Six more varieties were received from the same source in November.

Hevea Rubber.—No tapping has been done since 1920. Attention was given during the year to selective propagation by patch—budding, and a considerable number of branches were taken from the No. 2 tree for supplying bud—wood, the work being carried out chiefly by Mr. Thamotheram, an officer specially trained in the work.

Rubber seeds were plentiful, but the demand for seed was not great. The small number of orders received realized Rs. 193·50.

Sisal Hemp.—The plot planted in 1921 has made satisfactory progress, the plants being of even growth and averaging about 3 feet in height.

Cannon-ball Tree (*Couroupita guianensis*).—This handsome tree flowered here for the first time, but has not set fruit.

Double Coconut (*Lodoicea sechellarum*).—This palm ripened two nuts in April, ten years from the time these had set. The palm continues to flower at intervals, but only one flower has been pollinated this year, viz., by pollen sent from the male tree at Peradeniya. The former tree is at present bearing twenty-six fruits in different stages of development.

The nursery work for Colombo Gardens was transferred to Henaratgoda from the beginning of November, with the Foreman of Colombo Gardens in charge. A plot has been cleared and a commencement made to propagate suitable plants for borders, tubs, &c.

New Lavatories, &c.—For the convenience of visitors a small building has now been erected containing two lavatories and dressing rooms. The summer arbour has been re-thatched, and several rustic seats have been made and distributed in the gardens.

Rainfall.—Two marked periods of drought were experienced, viz., from January to March inclusive, with only 5·28 inches, and July to September with 5·07 inches. The following shows the distribution of the rainfall for the year :—

Month.	Inches.	Month.	Inches.
January	2·89	September	2·44
February	1·18	October	7·45
March	1·21	November	28·10
April	9·47	December	4·78
May	11·56		
June	11·87	Total ..	83·58
July	2·32		
August	0·31		

HAKGALA GARDENS.

The following is the report of the Curator, Mr. J. J. Nock :—

"GENERAL.

"The arboretum between the lower drive and lower garden path has been thoroughly overhauled and tidied up. Several trees, such as *Acacia melanoxylon*, *Rhododendron arboreum*, &c., have been cut out. Plants of each of the following casuarinas have been planted out :—*C. montana*, *C. distyla*, *C. equisetifolia*, and *C. stricta*.

"The triangular arboretum above the Cupressus avenue has received attention. The following acacias have been put out :—*A elata*, *A. pruinosa*, and *A. podalyriæfolia*.

"The shrubbery along the drive above lower pond has been overhauled and replanted with *Streptosolen Jamesoni*, *Brunfelsia bicolor*, *Pleroma macranthum*, *Melaleuca armillaris*, and *Cuphea platycentra*.

"The bank and Anthericum edgings along the drive under the Cupressus avenue have been replanted.

"THE ROCK GARDEN.

"During the year two new extensions to the rock garden have been opened.

"The section above the Cupressus tree in the centre of the garden has been levelled and planted up with flowering shrubs and small trees, such as *Sparmania africana*, *Acacia elata*, *Hakea saligna*, *Strobilanthes gossypinus*, *Streptosolen Jamesoni*, *Acacia podalyriæfolia*, *Bocconia frutescens*, *Sapium sebiferum*, and also Salvias, Veronicas, &c.

"The barbed wire fence below the garden has been re-erected and a row of Cupressus planted to form a hedge.

"A summer arbour has been built between the two Cupressus trees in the north-east corner of the garden.

"The area in front of the summer arbour has been levelled and turfed over, and the lawn so formed is being regularly mown.

"A large oval bed in the centre of the lawn has been planted up with a collection of succulents, such as *Opuntia Dellenii, Cotyledon metallica, Phyllocactus crenatus, Cereus grandiflorus, Agave americana, Opuntia robusta, Agave Schottii, Euphorbia Tirucalli, Agave miradorensis, Kleinia ficoides*, &c. Most of these plants were transferred from the succulent collection above the rose garden.

"A drain has been built through the ravine under the trees above the summer arbour and the bank on the rock garden side of same sloped and turfed.

"The undergrowth on the bank on the right of entrance path has been cleared and the bank sloped off and turfed.

"The Cupressus and Camphor trees on the bank above the entrance path have been cut out and this section opened up.

"Rocks have been arranged under the Cupressus tree in the centre of the garden and a collection of ferns, begonias, and other shade loving plants put out.

"The yellow and blue Nymphæas in the ponds have flowered well during the year.

"Special attention has been given to the general upkeep of the rock garden during the year.

"Rosary.

"The collection of roses received from Australia have not done very well during the year. All the plants have been pruned and are now making more satisfactory growth. The standards have been rather disappointing so far, but it is hoped these will improve later.

"Green fly has appeared at different times during the year, but has been kept in check by spraying with soft soap and water.

"The Euphrosyne rose on the fence round the rosary has flowered exceptionally well throughout the year.

"Fernery.

"This has been kept in good order and has been continually weeded and forked over.

"Two of the bridges over the stream were washed away on October 29 and have been replaced.

"Shrubbery above Rosary.

"This has been cleared of all the old acacias, &c., and the whole area sloped and turfed over. All the turf for this purpose being transported from Sita Eliya. A good deal of blasting had to be done to remove the rocks from the centre of the area. Five beds have been made on the side and planted up with annuals. Most of the shrubs from this area, such as Brunfelsia, Acalypha, Streptosolen, Spiræa, &c., have been transferred to the shrubbery above the Cupressus avenue.

"Improvements near Gate.

"The area above the Cupressus avenue has been cleared of all trees, rocks, &c., suitably sloped and drained, and planted up with a collection of shrubs, &c., such as *Brunfelsia bicolor, Streptosolen Jamesoni*, Azaleas, *Eupatorium Weinmannianum*, varieties of Abutilon and Salvias, &c. All these have become well established.

"Clumps of *Crinum Moorei* and a row of *Melaleuca armillaris* have been planted along the path above this area.

"A row of *Cupressus macrocarpa* has been planted out along the edge of the patana above this area to form a wind-break.

"Paths and Drives.

"All the principle paths and drives were put in good order during March and April. Sand used for the purpose being carted from Sita Eliya, and gravel dug and transported from the patana above gate.

"All the paths and drives were badly damaged by heavy rain which fell on the afternoon of October 29. The foundation stones on parts of the upper drive were exposed, and a considerable amount of labour was required to put things in order.

"Succulent Collection.

"All the plants from the collection have been removed, the majority being transferred to the rock garden, and the others being put out in various parts of the gardens. The bank is at present being sloped, and the area is to be used for a collection of Azaleas and Barberis.

"Fruit Plot.

"The plants have been kept weeded and have been regularly mulched and attended to generally. Peach and Citrus are doing fairly well, but the apples, pears, plums, and cherries have not made any appreciable progress since they were planted.

"Forest Timber Experiments.

"The following have been planted out in the clearing on the patana above the camphor plantation:—*Eucalyptus saligna* (67), *E. leucoxylon* (37), *E. pillularis* (38), *E. robusta* (39), *E. globulus* (142), *Pinus longifolia* (37), *Juniperus bermudiana* (37), *Casuarina montana* (70).

"The *Eucalyptus globulus*, raised from seed collected in Nuwara Eliya and planted out in January, when the plants were 1 foot high, have grown exceptionally well, many of the plants being 6 feet high.

"EUCALYPTUS PLANTATION.

"Plants of the following were put out in June:—*E. Saligna*, *E. robusta*. *E. maculata* var. *citriodora*, *E. pillularis*, *E. obtusifolia*, *E. calophylla*, *E. Luehmanni*, and *E. globulus*.

"A few of the old trees in the collection were blown down during the south-west monsoon and others damaged.

"ACACIA ELATA.

"The tree on the patana above the camphor plantation flowered well during May and June and seed has been collected and a few plants raised.

"CINNAMOMUM CAMPHORA.

"420 lb. of leaves and twigs of camphor have been sent to the Manager, Experiment Station, Peradeniya, for distillation.

"CALLIANDRA GUILDINGII.

"A few seeds of this have been collected for the first time at Hakgala and have germinated.

"SEVILLE ORANGE.

"The tree below the office continues to bear heavy crops, and over thirty-one dozen fruit have been sold during the year.

"ALEURITES FORDII.

"The plants in the plot opposite the laboratory have been attended to regularly and have been fenced as a protection against damage by cattle. The plants are not making much growth.

"NUWARA ELIYA SHOW.

"At the Nuwara Eliya Show held on April 13 and 15 a collection of cut flowers, including a box of the new roses imported from Australia and a collection of Conifers and Eucalyptus, &c., in baskets, were shown.

"INTRODUCTIONS.

"Plants and seed have been received from the following:—R. S. Hole, Forest Botanist, Dehra Dun; The Director, Melbourne Botanic Gardens, Australia; M. Herb, Naples; The Director, Regio Instituto ed Orto Botanico, Roma; The Director, National Botanic Gardens, Kirstenbosch, Cape Town; The Curator, Lloyd Botanic Gardens, Darjeeling, India.

"And from the following in the Island:—M. Kelway Bamber, Colombo; K. L. Gordon, Templestowe, Rozelle; The Manager, Bandarawela Hotel, Bandarawela; Mrs. Neill Campbell, Baker's Farm, Nuwara Eliya; A. C. Wilson, St. Leonards, Halgranoya; R. M. C. Jones, Cocogalla, Madulsima; Rev. E. V. Freeman, Nuwara Eliya; Campbell Dudley, Passara; Miss Wilkins, Culloden, Neboda; and Mr. John Cotton, Ambawela.

"THE WEATHER.

"The number of inches of rain recorded during the year was 84·27, falling on 177 days, compared to 84·05 inches on 195 days during 1921.

"The wettest month was October, with a rainfall of 20·16 inches; and the driest month March, with 1·70 inches.

"The highest temperature in the sun's rays was 159·2 on February 20, compared to 171·2 on November 12 of the previous year.

"The lowest temperature on the grass was 39·3 on December 28, compared to 35·1 on February 25 of the previous year."

NUWARA ELIYA GARDEN.

The Curator, Mr. J. J. Nock, reports as follows:—

"GENERAL.

"The main drive has received special attention during the year, the edges being returfed and the breadth of the drive made uniform throughout.

"The boundary fence below Park road has been put in good order and a row of Cupressus planted along same. A row of Cupressus has also been planted along the boundary fence between the Post Office and Memorial Corner.

"Several trees have been cut out during the year, including a large Eucalyptus on the lawn near the fountain, a few Cupressus in the revenue opposite Post Office and three Pinus near the meteorological shed.

"The area between the main road and river, behind the Memorial, has been taken in hand, and it is hoped before long to have this portion of the garden regularly mown. The swampy portion of this area has been drained.

"It is interesting to note that the Foxgloves flowered well in the main border in the early part of the year, as also did the *Wistaria chinensis*.

"The general condition of the garden has been greatly improved during the twelve months.

"Rosary.

"The collection of roses received from Australia have flowered well during the year. All have been pruned and the cuttings inserted in the nursery. The plants have been provided with aluminium labels.

"War Memorial.

"The laying out of the surroundings of the Nuwara Eliya War Memorial which was unveiled on November 11, has nearly been completed.

"Planting.

"The following have been planted out in various parts of the garden :—*Melaleuca armillaris, Acacia elata, Casuarina montana, C. Stricta, C. equisetifolia, Pinus longifolia, and Eucalyptus maculata* var. *citriodora.*"

THE GOVERNOR'S AND COLONIAL SECRETARY'S GARDENS.

The King's Pavilion Garden, Kandy.

The general condition of this Garden has been well maintained. All the borders have been overhauled and manured, and replanted where required. Routine work has been carried on as usual.

The Lodge Garden, Kandy.

The beds, borders, and lawn have been maintained in good condition. A jak tree, whose foundation was affected by heavy rain in July, fell across a wing of the garage, causing the latter much damage.

The Queen's House Garden, Colombo.

This garden has undergone much alteration and improvement. A considerable portion of the tall shrubbery in front has been removed, the ground levelled and turfed, and several flower beds made.

A design of flower beds has been made in the lawn on the sea frontage, and a tennis court made in the south corner of the latter.

The ground in front of the new quarters for the Staff has been cleared, levelled, and much improved, while the collection of pot plants has also received special attention.

The Temple Trees Garden, Colombo.

This Garden has been maintained in good order. A row of Temple trees (*Plumeria alba* and *P. rubra*) has been planted along the new frontage boundary rendered necessary by the proposed widening of the Colpetty road.

Queen's Cottage Garden, Nuwara Eliya.

The Hakgala Curator reports :—

"A number of improvements have been carried out during the year and the garden and grounds, kept in good order.

"*General.*

"A Rosary has been made between the house and Staff cottage, and has been planted up with a collection of eight dozen rose plants imported from Australia. All the plants are doing well, and promise to give a good show during the 1923 season. A row of Euphrosyne rose has been planted on the slope to the north of the Rosary to form a boundary.

"The straight path leading from the flower garden to the main road has been levelled off and turfed over. To take its place, a new path has been opened up along the boundary fence to the north of the old path.

"A row of Cupressus has been planted along each side of the old path to take the place of the present avenue of *Acacia melanoxylon* and Grevilleas which are to be cut out later.

"A few more of the unsightly trees of *Acacia melanoxylon* have been cut out.

"The large *Cupressus macrocarpa* tree on the north side of the house has been trimmed and the shrubbery underneath thoroughly overhauled and replanted.

"The Duranta hedge opposite the garage has been extended along the lawn to the entrance to kitchen.

"*Ficus repens* has been planted along the base of the walls of the house, to take the place of the present Ipomœa creeper.

"Clumps of *Pleroma macranthum,* Spiræa, *Ulex europæus,* &c., have been planted out in the arboretum below the house.

"Plants of Cupressus have been put out on the slope immediately below the flower garden.

"*Ponds.*

"All the four ponds have received a thorough cleaning, and although a large number of seedlings of the *Nymphæa stellata* continue to appear it is hoped to keep these in check.

"The banks of the ponds have been sloped where necessary and put in good order.

"A large number of *Melaleuca armillaris,* Cupressus, &c., have been planted round the ponds.

"Vegetable Garden.

"Owing to club-root, cut-worm, and bad weather during the year it has been very difficult to grow vegetables satisfactorily.

"Hares were very troublesome during the year, and a great deal of damage has been done to the vegetables, carnations, &c.

"The pear trees bore a heavy crop of fruit during the early part of the year."

CUDDESDON GARDEN, NUWARA ELIYA.

The Hakgala Curator reports :—

"The flower and vegetable gardens have been kept in good order during the year.

"The Australian roses have flowered well. All have been pruned and the cuttings have been inserted.

"A new lawn mower has been purchased, and the lawns, which can now be regularly cut, have greatly improved in appearance.

"A collection of flowering shrubs and small trees has been planted under the Eucalyptus trees on the north side of the front lawn.

"The cultivation of peas, beans, &c., has been very difficult during the year owing to the bad weather."

H. F. MACMILLAN,
Superintendent of Botanic Gardens.

Peradeniya, January 31, 1923.

X.—PUBLICATION DEPOT AND CENTRAL SEED STORE.

JUDGING from the increasing demands from the public generally for services of this division, the fact is apparent that the Central Seed Store is filling a decided want. It is a distributing agency of publications, seeds, and other agricultural requirements, such as vegetable and flower seeds, cuttings, yams, tubers, paddies, grains, fodder, green manure, shade trees, coffee, kapok, cotton, pineapple, plantains, &c. Demands for supplies are being received daily, due, no doubt, to the fact that weather conditions in different districts vary, while applications are received from all parts of the Colony, and even abroad. This constant demand has rendered it necessary to hold fresh stocks throughout the year, which the stores are in a position to do, drawing, as it does, for its vegetable and flower seeds at regular intervals supplies from England, France, America, Australia, Japan, India, from such well known firms as Carter & Sons, Vilmorin Andrieux & Co., W. Atlee Burpee, Brunnings, Sutton & Sons, and Government Farms. During 1922 the following were dealt with:—

	Bushels,.	Pounds.	Packets.	Number.
Paddy ..	190½	—	—	—
Dhall ..	—	380	—	—
Maize ..	—	52¼	—	—
Sorghum ..	—	38¾	—	—
Castor ..	—	135	—	—
Green gram ..	4	—	—	—
Green manure, seeds and cuttings ..	—	1,049	—	900
Groundnuts ..	—	274	—	—
Coffee seeds ..	½	4¾	—	—
Ginger ..	—	30	—	—
Turmeric ..	—	12	—	—
Artichoke ..	—	22	—	—
Yams ..	—	34	—	—
Innala ..	—	18	—	—
Grass seeds ..	—	2	—	—
Kapok ..	—	21	—	—
Hedge plant seeds ..	—	79	—	—
Papaw seed ..	—	24¾	—	—
Vegetable seeds ..	—	91¼	42,919	—
Flower seeds ..	—	—	1,310	—
Curry stuffs ..	—	1¾	464	—
Pineapple suckers ..	—	—	—	16,010
Plantain suckers ..	—	—	—	250
Cotton seeds (Cambodia) ..	—	6,646½	—	—
Cotton seeds (Durango)	—	2,068	—	—
Cotton seeds (South African) ..	—	22	—	—
Cotton seeds (Karanani) ..	—	62	—	—
Cotton seeds (Sea Island) ..	—	22	—	—
Grafted plants ..	—	—	—	524
	195	11,089¾	44,693	17,684

It will be noticed that the demand for seed paddy has appreciably decreased, as compared with last year, indicating the improved position of the cultivator and supplies generally of districts. Last year no less than 1,128 bushels were supplied.

Grafted fruit plants, including orange, mango, lime, fig, grape, guava, pomegranate, pomelo, were at intervals imported from Australia, Bangalore, Salem, Calcutta, Coconada, and Jaffna. An enterprising planter at the latter station has started supplying mango grafts, of which he is reported to have over fifty varieties, locally grafted. The demand for grafted plants is popular.

The publications available at the Depôt include :—

Title.	Annual Subscription.		Single Copy.	
	Local. Rs. c.	Foreign. Rs. c.	Local. Rs. c.	Foreign. Rs. c.
"Tropical Agriculturist" ..	10 0 ..	15 0 ..	1 0 ..	1 25
Bulletins	1 0 ..	2 50 ..	0 15 ..	0 40
Leaflets	— ..	— ..	0 5 ..	0 15
Annals	2 50 ..	6 0 ..	— ..	—
Circulars	— ..	— ..	0 15 ..	0 40
"Govikam Sangarawa" ..	0 50 ..	1 0 ..	0 6 ..	0 15
"Kamat Tholil Velakkam" ..	1 0 ..	1 50 ..	0 10 ..	0 15

Special Centenary Edition of the Royal Botanic Gardens, Peradeniya, Rs. 5.

J. S. DE SILVA,
Manager, Publication Depôt and Central Seed Store.

February 9, 1923.

DEPARTMENT OF AGRICULTURE.

REPORT OF THE DIRECTOR OF AGRICULTURE FOR 1923.

SECTION I.

Agriculture in Ceylon.

The year 1923 will be remembered in agricultural circles, particularly of planting districts on the south-west side of the Island, as being a year of exceptionally heavy and continuous rainfall. In some districts rain fell during the months of June, July, and August on every day, and many recording stations registered rainfalls which were 25–30 per cent. in excess of the average. The year opened with a month of heavy rainfall, especially on the north-eastern side of the hills to the east of Matale. Exceptionally heavy falls were recorded in the North-Central Province, and many irrigation tanks were breached as the result of the floods. February was a dry month and most stations recorded no rain. March was an average month, excesses of rain being recorded only in the Northern and North-Western Provinces. April was below normal, except in the south near Galle. The first half of May was dry with strong winds, but after the middle of the month occasional heavy falls of rain were recorded at some stations. The south-west monsoon broke on the early days of the month and was very active during the whole month. All rainfall recording stations on the south-west side of the Island registered rainfalls which were considerably above the average. The Ambagamuwa, Dolosbage, and Adam's Peak districts recorded rainfalls in excess of 70 inches, falls of over 100 inches being registered upon a few estates. Portions of the Kelani Valley registered over 65 inches, while Pussellawa, Nawalapitiya, Maskeliya, and the other portions of the Kelani Valley recorded over 50 inches. While, however, the hill stations on south-west registered rainfalls greatly in excess of normal, the coastal area, even of the Western Province, was below normal, and the whole of the north was dry. The heavy monsoon rains of June were continued throughout July in the south-west quadrant of the Island, the districts of Ambagamuwa, Dolosbage, and Pussellawa registering rain every day and much above normal. Similar conditions prevailed in August, the district of Ambagamuwa again registering rain on every day of the month. In the north and east of the Island the rainfall during August was below the normal and this deficit was continued during September on the east of the Island. In the south-west quadrant however the rainfall continued to be in excess, more especially towards the south. During the early part of October there was a change for the better, but during the latter half of the month heavy thunderstorms occurred, particularly in the Ambagamuwa, Dolosbage, and Kelani Valley districts. During November rainfall was irregular; in the Central and Southern Provinces it was in excess of the average, but in the north it was considerably below normal. December was wet during the earlier part of the month, particularly in parts of the Central Province, but drier weather was experienced during the last week. Temperatures below normal were recorded throughout the south-western side of the Island and there was complete absence of sunshine for long periods. The effect of the excessive rainfall and shortage of sunshine in some tea growing districts resulted in poor flushing and consequent short crops. Very poor crops were secured during the third quarter of the year, and if it had not been for the improved crops in the north-eastern portion of the Island, the total tea exports would have been considerably below normal. The weather also seriously affected work on rubber estates and made tapping extremely difficult. A very large number of tapping days were completely lost and many estates found it difficult to secure even their restricted output. The weather conditions were favourable to the spread of disease, but most estates were alive to this fact and took the necessary precautionary measures. Pod disease and leaf fall was no more prevalent than in the previous year, except in the Ratnapura District. This was probably due to the burst of the monsoon being somewhat later than usual. Canker occurred more commonly on some estates, and bark rot was particularly prevalent where effective steps were not taken for its control. Coconuts on the south-west side of the Island benefitted from the rainfall of the latter half of the year, and promise to give very good crops during 1924. The heavy rainfall in the latter part of the year and the almost complete absence of sunshine was responsible for a severe outbreak of pod disease and canker in cacao plantations. Much of a promising autumn crop was completely lost and a very large percentage of the actual crop collected was classed as "Blacks." Cardamom crops were short in the spring owing to the excessive drought of 1922, but the autumn crop was a good one, even though collection was hampered during December by heavy rain. The paddy crops suffered severely in many districts from flooding. This was particularly marked in the Southern Province, where the harvest of the whole crop around Galle was completely ruined by continued floods, and in several parts of the Central Province, where the yala crop suffered severely. In the Eastern Province, however, a severe drought was experienced, and large areas of paddy lost for want of sufficient water while very considerable damage was done to other areas by the floods during December.

Tea.

2. Another exceptionally prosperous year for this industry can be recorded. There were only seventeen sales during the year in which the average fell below Re. 1 per lb. The demand for tea was good throughout the year and high average prices were maintained. The quality of the teas was below normal and manufacture was complained of in some instances. There is little doubt, however, that abnormal weather conditions were responsible for these defects, and that every endeavour is being made to give attention to the manufacture of teas of high quality.

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3. The continued prosperity of the tea industry has enabled estates to continue very liberal manuring and cultivation programmes, and the resulting effect on the general condition of the bushes is noticeable. This prosperity has also led to the consideration of the establishment of a Tea Research Scheme for the industry, and at the end of the year the matter was under the consideration of a Committee. Pests and diseases which attack tea bushes when they are of low vitality, such as shot-hole borer and red rust, are becoming less common and are doing very considerably less damage. Tea tortrix was prevalent in the early part of the year, but practically disappeared during the excessive wet weather. Termites were recorded from a greater number of estates and are being dealt with experimentally. An outbreak of scale occurred in the Haputale district at the end of the year, and was particularly severe in one area. The investigation of the Witches' Broom disease of tea was continued by the Mycological division of the Department during the early part of the year, but its further investigation had to be held over owing to changes of staff.

4. The prosperity of the tea industry has resulted in better cultivation being given to small holdings and has given rise to an increased desire both on the part of estates and of small holders to open up new clearings. This opening of new areas has resulted in an increase in the demand for tea seed. The local tea seed crop was largely a failure, not only on the south-west side of the Island, where climatic conditions were most unfavourable, but also on the north-east side of the Island. The question of the abolition of the total prohibition of the import of tea seed from India was considered during the year, but in view of the prevalence of blister-blight disease in India, and of the difficulty of providing disinfecting measures against the importation of this disease with seed the Estates Products Committee wisely decided to recommend the continuance of the present regulations. The difficulty in securing seed resulted in greatly enhanced prices for the small local crop and has given rise to a desire for information regarding the vegetative propagation of tea. Experimental work has been done at Hakgala Gardens with the propagation of tea from cuttings and further work has been commenced at Peradeniya. Estates are also leaving areas of tea of good jat for seed bearers, and there is little doubt that Ceylon will be able to supply to the full its own requirements of seed in a year or two, even if the present demand for opening up new clearings is maintained. The removal of tea stumps in the Island is still controlled under a permit system, and during the year 211 permits were issued covering 2,093,500 plants.

5. The year was a satisfactory one in regard to labour. The Ordinance No. 1 of 1923, relating to Indian Immigrant Labour, came into force, and all estates employing Tamil labour now pay a quarterly assessment, and Government controls all introduction of labour from South India. The number of Tamil immigrants who came to Ceylon in 1923 was in excess of the average, and many of them were immigrants who were returning after some years absence. Increased wages, the abolition of the "Tundu," and improved housing conditions have been the reasons for this improvement in the labour returns, and there is little doubt that Ceylon estates are now attractive for the surplus population of South India.

6. Increased profits have made it possible to effect considerable improvements in factory equipment, and an extensive campaign for the rebuilding of labourers' lines has been started. The engineering firms have had their capacities taxed to the utmost in providing for the required additions and alterations to factories. The rebuilding of lines has been undertaken in the desire to improve the housing of labour and their sanitary conditions. If this campaign is continued for a further few years, there is bound to be a very marked improvement, and Ceylon estates will be able to feel that they have met every modern requirement towards the housing of labour. The provision of free food for expectant mothers and for non-working children is helping to improve health and to make labour less desirous of moving from estate to estate. The encouragement of labour to keep cattle and goats and to open gardens is also tending to make labour contented.

7. The exports of tea during 1923 were 181,939,731 lb. black and green, against 171,807,581 lb. in 1922 and 161,610,966 lb. in 1921. The average price for tea sold at auctions in Colombo amounted to Re. 1·02, as against 85 cents in 1922 and 70 cents in 1921.

Rubber.

8. The restriction scheme was in operation throughout the year and the results have continued to demonstrate the value of the scheme to the industry. By the adoption of the scheme a higher average price has been maintained and stability re-established. The average price did not reach the figure which the industry hoped for, and a restriction to 60 per cent. was retained throughout the year, except in the case of the quarter February-April. Towards the end of the year, the prices fell and the market weakened very considerably. Under restriction in Ceylon but small leakages occurred, and although there were numerous difficulties to be faced by the Rubber Controller, the majority of estates were well satisfied with the restricted outputs accorded to them. Restriction enabled estates during the year to make higher profits than during the year immediately before restriction was decided upon, and greater attention has been given, as the result, to disease control, cultivation, and manuring. Many estates continued the policy of resting portions of their planted areas, and there is little doubt that this policy will be beneficial to the trees and will result in better bark being available for future tapping. The total acreage under rubber is now 404,297 acres in estates of over 10 acres and 38,814 acres in small holdings.

9. The weather conditions in the rubber growing districts were very bad. During every month from the burst of the south-west monsoon in early June to the end of the year the rainfall was excessive, and for considerable periods there was a complete absence of sunshine. Such conditions made work on estates extremely difficult and short crops inevitable and favoured the occurrence of fungus diseases. The occurrence of pod disease and leaf fall was common in all low-country districts and was particularly severe in the Ratnapura District. In some areas in this district this disease was responsible for almost complete secondary defoliation, and there is no doubt that this disease is the most serious that the industry has to contend with at the present time. When it does occur, it is usually widespread and impossible of practical control. Its incidence depends largely upon the weather conditions, and it does not become so general or so serious in its effects when the rains are late and foliage and pods are of fair age. The common leaf fall and pod disease of Ceylon is not associated with a stoppage of the latex flow, as is the case in South India, except when *Phytophthora Meadii* is the causative fungus. Its effect upon the vitality of the affected trees is however accumulative, and experiments have been begun under the supervision of the Rubber Research Scheme to ascertain if these effects can be mitigated by applications of manures.

It is too early yet to state definitely what the results of these experiments are likely to be. During the first year, the manured plots gave indications of the disease several days after the control (unmanured) plots had been attacked, and at the end of the disease "season," the foliage of all manured plots was denser and darker in colour than the corresponding control plots. Canker occurred on most estates, but was kept well in hand. Bark rot was more prevalent and several estates suffered severely, especially during the months of September and October. More systematic application of disinfectants to tapping cuts has been practised, and the damage caused by the disease has been much less than was to be expected, having regard to the exceptional weather conditions—conditions which were extremely favourable to the spread of this disease. The Rubber Research Scheme has continued its investigations into the control of bark rot, and there is no doubt that the course of the disease can be checked and the number of cases considerably reduced by the careful and systematic application of disinfectants.

10. The standard of crêpe manufacture has remained high and very few complaints of a serious character were made in regard to Ceylon's crêpe rubber. In regard to sheet, however, the position is not so satisfactory. Mould has been extremely common throughout the whole year, rust has not been infrequent and greasiness and tackiness complained of. Ceylon sheet still leaves much to be desired and the standard can be readily improved, if a more uniform method of preparation and of smoking were adopted. The Rubber Research Scheme carried out a series of investigations into the cause of "rust" and confirmed the Java results that it is caused by micro-organisms and develops in badly ventilated smoke houses and where the surface drying of the sheet is too slow. By the proper cleansing of coagulating pans, jars, &c., by the drying of sheets in an airy situation before removal to the smoke house and by the proper ventilation of smoke houses this disease of sheet rubber can be completely overcome, and there is no reason whatever why "rusty" sheet should be made. Investigations are now being made by the same scheme in regard to the disinfecting action of smoke and into the prevention of mould.

11. Brown bast is probably more prevalent than is fully appreciated, and there is consequently a danger of depreciation of estates taking place. A complete Brown bast census was made on two areas during the year. Environment plays an important part in the development of Brown bast. Trees growing in damp hollows and places sheltered from the wind appear to be less affected than those grown in drier situations. Most estates are now treating Brown bast in its early stages, and there appear to be indications that the disease is not on the increase.

12. There has not been as much work done in connection with budding of rubber as in 1922, as the industry is adopting a waiting policy. The results of some estate experiments in Java have not come up to expectations and it is still felt that the budding of rubber is still in its experimental stage. Interest has consequently centred towards the results of the individual tapping experiments from seedlings raised from seed from the well-known high yielding Henaratgoda No. 2 trees. The results of the yields of these trees have again been analysed and it has been found that trees with the highest initial yield have shown the highest percentage increase in yield, whilst trees with the lowest initial measurements for girth, cortex thickness, and number of latex vessel rows show the highest percentage increases in these characters. It is therefore concluded that yield is independent of vegetative vigour and is an inherent character. A tree which is a poor yielder will remain a poor yielder, but it is possible for high yielders to become mediocre or even poor as the result of unfavourable conditions or of attacks of disease. It is therefore important that cultivation should be directed towards the maintenance of the vitality of the trees and manuring towards the maintenance of health and vigour.

13. The exports of rubber during the year amounted to 83,816,228 lb., as against 104,595,278 lb. in 1922. America was the largest buyer, taking 66 per cent. of the total exports. The shipments of latex amounted to 11,486 gallons, of which 10,559 gallons were sent to the United Kingdom. The exports of specially prepared crêpe rubber for soles have increased during the year.

Coconuts.

14. The coconut crops for the year have been very short in consequence of the unfavourable weather conditions which prevailed in 1922. The total exports of coconut products are shown in the following table :—

		1923.		1922.
Coconut oil	cwt.	480,543	..	554,626
Copra	cwt.	1,015,465	..	1,686,589
Desiccated coconut	cwt.	818,793	..	768,215
Coconut poonac	cwt.	116,549	..	115,479
Coconuts	nuts	15,693,670	..	22,317,747
Bristle fibre	cwt.	126,311	..	106,265
Mattress fibre	cwt.	232,771	..	212,860
Coir yarns	cwt.	105,088	..	102,688

15. Exports of coconut oil show a decrease of 74,083 cwt., the largest decrease of export being against the United Kingdom. Prices ruled high throughout and ranged between Rs. 540 to Rs. 665 per ton of ordinary oil. Copra exports show a decrease of 671,124 cwt. Prices were high, ranged during the year from Rs. 77 to Rs. 103·50 per candy of No. 1 copra, and exceptionally good prices were also realized for No. 2 quality. The trade in desiccated coconut however greatly improved during the year and the exports exceeded those of 1922 by 50,578 cwt. They were however 52,150 cwt. below the exports of the year 1921. The average price for this product was 23¼ cents per lb., but prices of 27 cents per lb. were realized during the month of April. The demand for fibre was satisfactory throughout the year and good prices were realized. The export of bristle fibre increased by 20,046 cwt. and mattress fibre by 19,911 cwt. over 1922. The exports of fresh coconuts showed a decrease of 6,624,077. Good prices however ruled throughout the year, but weather conditions made transport difficult, and the demand for nuts by desiccated mills was constant. Exports of poonac showed a slight improvement during the year, over 90 per cent. of the exports going to Belgium.

16. Cultivation of coconut estates continues to spread and more liberal applications of manure are now being given. There is also an increase in the use of green manures, particularly of *Tephrosia candida*, while the increased use of the coir dust and waste from fibre mills is becoming more general where costs of transport are not high. The manurial experiments at Chilaw and the co-operative experiments

with Gate Mudaliyar A. E. Rajapakse have been continued. These experiments are not considered to be on a sufficiently large scale for the industry, and during the year proposals for the establishment of a Central Research Station and a Research Scheme for the coconut industry have been under consideration. There is no doubt that the establishment of such a scheme is required by the industry and will be supported by it and has the fullest sympathy of Government.

17. Pests and diseases of coconuts have been very prevalent in some areas during the year. The caterpillar pest (*Nephantis serinopa*) has continued to cause serious damage in the Batticaloa District of the Eastern Province. and has been recorded from estates in the Central, North-Western, and Western Provinces. A serious outbreak of red weevil and black beetle occurred in the Southern Province and had to receive special attention by the Plant Pest Inspecting Officers of the Southern Division. Pests have also been noticeable in parts of the Puttalam District and appear to be on the increase. There can be no doubt that greater attention must be given to the pests and diseases of coconuts if the position is to be considered to be secure. The owners of estates appreciate the importance of dealing with outbreaks, but there are several small estates and gardens which cause considerable anxiety by reason of their indifference. When Plant Pest Inspectors have been sent to estates or to villages a considerable improvement has been effected when it has become realized that the work of the Department is directed towards education and assistance rather than towards prosecution. In the Eastern Province control measures were resisted by certain individuals who should have been the leaders of the smaller cultivators, and steps had to be taken to set the legal machinery into action. Such resistance to measures designed for the welfare of an industry, and administered with patience and tolerance, is foolish, and finds no support in those agricultural associations which have the welfare of the Island at heart.

Cacao.

17. The cacao crops were, on the whole, satisfactory, but the greater part of the autumn crop was spoiled by the continuous wet weather combined with complete absence of sunshine for long periods. Pod disease and stem canker were very prevalent. A large amount of the autumn crop did not mature and a very large percentage of it was harvested as "Blacks." Prices were poor throughout the year and there was practically no demand. Towards the end of the year however there was a considerable improvement in prices and the demand for good quality cacao was satisfactory. Investigations have been begun at the instance of the Estates Products Committee of the Board of Agriculture into the quality of Ceylon cacao. There is a feeling that since much of the Criollo varieties have been replaced by Forastero, the high quality of Ceylon cacao is not being retained. The exports of cacao amounted to 60,904 cwt., as compared with 83,210 cwt. in 1922.

Cardamoms.

18. The exports for 1923 were 2,788 cwt., as against 4,096 cwt. in 1922. The shortage was due to the severe drought of 1922 affecting the spring crops, and to weather conditions interfering with harvesting the autumn crop. Prices ruled very high throughout the year ranging from Rs. 2 to Rs. 2·75 per lb. and the demand was a strong one.

Cinnamon.

19. The exports for this product were as follows :—

		1923.		1922.
Cinnamon quills ..	.. cwt.	32,587	.. cwt.	31,401
Cinnamon chips ..	.. cwt.	12,397	.. cwt.	11,573
Cinnamon oil (bark) ..	.. oz.	726,155	.. oz.	190,501
Cinnamon oil (leaf) ..	.. oz.	1,244,437	.. oz.	549,776

The exports show an increase and the prices secured were also satisfactory. On the western side of the Island there is no expansion of this industry taking place, but there is a possibility that the introduction of cinnamon cultivation into the Batticaloa District of the Eastern Province would be fraught with satisfactory results.

Citronella.

20. The exports of citronella oil amounted to 1,121,271 lb., as against 1,299,889 lb. in 1922. High prices were maintained throughout the year, particularly in the last quarter when prices of Rs. 2·50 to Rs. 2·65 per lb. ruled. This strong demand for citronella at high prices gave rise during the year to an adulteration, which has caused considerable losses to shippers and damaged the name of Ceylon citronella oil in the markets of the United States of America and of the United Kingdom. Quantities of cheap spirit were imported from the East and used as an adulterant in addition to the usual adulterant kerosine All such oil, having as it had a high alcoholic content, was refused entry by the Customs authorities of the United States and the United Kingdom and much of it was returned to Ceylon. The matter is under the consideration of a Sub-Committee of the Low-country Products Association and will later be considered by the Board of Agriculture. There is no doubt that steps should be taken to prevent the export of adulterated oil and there is even no reason why adulteration with kerosine oil should be tolerated. Java can produce and export a pure oil, and there would appear to be no reason why Ceylon should not do the same.

Other Products.

21. The following were the exports of other agricultural products during the year :—

Tobacco	.. lb.	2,980,143	Cinchona	.. cwt.	576
Arecanut	.. cwt.	160,578	Coffee	.. cwt.	97
Kapok	.. cwt.	6,517	Ginger	.. cwt.	66
Pepper	.. cwt.	3,866	Nutmegs	.. cwt.	305
Papain	.. cwt.	342	Cloves	.. cwt.	116

22. The exports of tobacco were below normal owing to unfavourable weather conditions. Some extension of White Burley cultivation took place and the exports of this type of tobacco made through the Department of Agriculture fetched good prices (1*s.* 8*d.* per lb.) on the London market. During the year visits were made to Ceylon by representatives of the British-American and Imperial Tobacco Companies and by a representative of the Indian Leaf Tobacco Development Company. They all confirmed

the view that the only types of Ceylon tobacco suitable for European markets are the Burley types, and recommended that the trials already made with these types in the Jaffna District should be extended to others. The policy of the Department will be to concentrate on the spread of these types and on the manufacture of leaf suited to the European markets.

23. There was good business in arecanuts during the year. The exports showed a satisfactory increase and the prices offered were satisfactory. More planting of this palm should be encouraged as there is a good deal of annual destruction taking place without any systematic effort being made to replace those palms being cut out.

24. The prices for kapok were very high during the year and the demand was very keen. These high prices led to some adulteration with ordinary cotton from one district, and buyers in Colombo were considerably perturbed by this adulteration. The further planting of kapok by village cultivators, which it was thought likely to take place, has not materialized. There is no doubt however, that at present prices, kapok is a remunerative crop.

25. Papain still secures good prices and a high grade estate product is being turned out.

26. The cotton experiments of the Department in the Hambantota District continue to be successful and a peasant growing scheme was organized during the year. Seed of American Upland varieties of cotton were distributed to all small growers, who had taken an acre of land on permit for cotton cultivation. In all some 1,649 acres were applied and paid for, but weather conditions during the time when clearing and burning operations should have been carried out were so bad that not more than 350–370 acres of the above acreage was actually prepared for cotton cultivation. An additional 100–120 acres of garden lands were also sown with cotton, and small growers in the Hambantota District were responsible for growing between 350 and 400 acres of cotton. The weather conditions were very wet and weeding was a difficult task. Despite these abnormal weather conditions good work has been done and some fine yields of cotton produced. A purchase scheme has been worked out by the Department of Agriculture in co-operation with the Spinning and Weaving Mills, and all small growers will receive cash for their seed cotton as it is brought into buying centres. The Department of Agriculture continued its cotton experiments on 45 acres of land, and the Spinning and Weaving Mills cultivated 180 acres. It is expected that these beginning will result in the establishment of a cotton industry in the Hambantota District, and interest is already been shown in its possibilties by the purchasers of cotton. It is also hoped to interest the Empire Cotton Growing Corporation in these experiments in the Hambantota District and in the smaller experiments being carried out by the Department in other districts.

27. The small fibre mill at the Anuradhapura Experiment Station turned out some good sisal during the year, which has been shipped to England for valuation and for sale. The Maha Iluppallama sisal estate has begun the erection of machinery and will be turning out sisal early in 1924. The drought of the middle of 1923 in the North-Central Province affected sisal cultivations and a certain amount of poling began as the result of its effects.

28. A beginning has been made in the home canning of pineapples by a Kandyan gentleman in the Central Province. He has visited India and investigated the home canning of fruit there. It is to be hoped that this small beginning will be successful and will eventually lead to a pineapple canning industry, the excellent prospects before which are undoubted.

29. Some small commercial shipments of wattle bark were made during the year, but the results were not highly satisfactory owing to high freight charges. There have been some inquiries regarding the possibilities of Ceylon for wattle bark production and this question is being fully investigated by the Departments of Agriculture and of Forestry.

Food Products.

30. There is no doubt that the question of increased food production is the most important agricultural problem requiring solution at the present time. Most of the land taken up for paddy cultivation by capitalists during the past few years has been surrendered, and considerable areas of the land which was opened in the Batticaloa District are likewise going out of cultivation. The Colony's dependence upon rice supplies from India and the insecurity of the position is fully recognized. The problem is how such a position can be improved. There is no doubt that it can only be done by the gradual extension of existing areas and by the improvement of yields. It has been demonstrated on more than one occasion that paddy growers are generally reluctant to migrate from their homes to new areas, and that they prefer to extend, if possible, into fields adjoining those already under cultivation. Such extension is dependent upon making the village irrigation works secure against damage from floods, and upon an extension of such works. There are enormous numbers of village works in a state of disrepair, and not infrequently cultivators under them are indifferent to the provision of permanent sluices or dams. The proper repair of these village works and the provision of masonry sluices will go far towards improving the situation, and may assure regular crops and even provide for considerable extensions of cultivations. Government has decided upon a policy of improving village works, and there can be no doubt that if this policy is pursued for a series of years, and there is response and co-operation on the part of cultivators, much improvement in output of paddy will result. Combined with this work of improving village works should be an improvement of the road system and the provision, when required, of additional medical aid. The results of such a policy will not be immediately apparent, but will be cumulative. At the same time, the work of vel-vidanes requires closer supervision, and it is hoped that this will be possible.

31. The question of financing the paddy grower is another matter requiring the closest possible investigation. Co-operative societies exist in most districts, and the work of the Batticaloa Paddy Bank and its affiliated primary co-operative societies deserves the closest investigation, with a view to extending its operations, if possible, and to starting similar organizations in other paddy growing areas. In all these matters of financing small growers through co-operative societies, there are two main difficulties to overcome, viz.: (1) the unsatisfactory repayment of loans by borrowers on their due date, and (2) the reluctance of wealthy proprietors of the district to support the movement with funds. It cannot be expected that Government should be required to provide all the funds for the co-operative movement. It would be most unsound finance to do so. On the other hand, it cannot be expected that capitalists should invest funds in the movement until the business habits of the borrowers improve. The co-operative

movement of Ceylon requires willing, disinterested workers, and offers an opportunity for good work to a number of young men desirous of improving the lot of the small cultivators. Without a proper system of finance, the paddy industry cannot occupy the position it should and its improvement will be difficult to secure.

32. The improvement of yields from existing lands has been made the special duty of the Department of Agriculture during the past few years and there is no doubt that its efforts are beginning to bear fruit in many areas. Pure-line paddies have been raised at Anuradhapura and Peradeniya Experiment Stations and a beginning made with their distribution. Although in many cases there have been disappointments, and the high yields secured under conditions of good cultivation and irrigation on experiment stations have not been obtained by village cultivators, yet some of the strains have given excellent crops, and at one centre a yield of nearly 25 per cent. in excess of the ordinary paddies has been secured. Every grain of this variety has been retained for seed and between 20 and 30 acres of this selected paddy will be sown during the coming season. Similarly at other centres some very good crops have been secured, and the growers are desirous of retaining all the seed of these improved types for their own use during the next year. The results of this first trial of selected varieties have confirmed the opinion held by the Department that crops can be improved by between 20–25 per cent. by the use of specially selected seed, but it has also emphasized the differences of soil and climatic conditions prevailing in the different paddy growing areas, and has necessitated a modification of the policy which was originally laid down. The decentralization of work is being tried, and an effort made to select from paddy varieties peculiar to different districts improved strains which will be sent back to these districts.

33. The manuring, weeding, and transplanting demonstrations have been continued in all districts and satisfactory results are being secured in many centres. As the result of such demonstrations in maha crop for 1922–23 upon land owned by the Korala of Pussela, North-Western Province, over 40 cultivators have manured, transplanted, and weeded an area of over 125 amunams of paddy during the present maha crop. Similar results are being secured at other centres, and there is no doubt that the effect of these demonstrations is becoming noticeable.

34. Competitions are increasing in favour. The numbers of such competitions are increasing and the number of entries is becoming much greater in some areas. These competitions tend to encourage much better system of cultivation and bring the Agricultural Instructors into close touch with competitors. As the organization of these competitions improves, there is no doubt that they will have considerable influence of an educative value on village cultivation.

35. Paddy crops suffered considerably during the year from the weather conditions. In the western side of the Island floods prevailed. Much damage was done to crops, particularly in those districts where heavy rains fell at harvest time, and many fields could not be sown owing to their flooding at sowing time. In the Eastern Province, a severe drought prevailed and considerable areas of paddy were lost in the northern part of the district. Floods prevailed at the end of the year in Batticaloa and much damage was done. In those areas flooded at harvest time, seed paddy was ruined, and some difficulty in the supply of good seed paddy was experienced in the Kalutara and Galle Districts.

36. Several outbreaks of the swarming caterpillar of paddy (*Spodoptera mauritia*) occurred during the year; serious damage was done in the Trincomalee and Batticaloa Districts of the Eastern Province and at Tissamaharama.

37. The rice mill at Anuradhapura jail continued to work during the year and the financial position is as follows :—

Advance Account.

Balance Sheet of the Government Rice Mill for the Year ended September 30, 1923.

Liabilities.	Amount. Rs. c.	Total. Rs. c.	Assets.	Amount. Rs. c.	Total. Rs. c.
Advance due to the Treasurer ..	—	.. 10,000 0	Cash in Kachcheri ..	—	6,998 74
Profit	—	.. 1,441 25	Paddy in stock :—		
			100 bushels at Rs. 2·34	234 0	
			Rice in stock :—		
			553 3/8 bushels at Rs. 5·88 ..	3,256 47	
			Broken rice 7/8 bushel at Re. 1 ..	0 25	
			Bran in stock :—		
			1 bushel at 25 cents ..	0 25	
			34 bushels at 12 cents..	4 8	
			1 bushel at 6 cents ..	0 6	
					3,495 11
			Debts receivable ..		947 40
Total ..		11,441 25	Total ..		11,441 25

Other privately owned mills which worked during the year were Mr. W. A. de Silva's mill at Ratmale and two mills at Jaffna.

38. Interest still continues to be taken in the planting of jak, and it is to be hoped that Village Committees will encourage its cultivation in all districts where it will grow, as in time of shortage jak comes a most valuable asset to a village population.

SECTION II.

Work of the Department of Agriculture.

39. The work of the Department has been directed towards the consolidation of its previous policy of decentralization. The Government decided that the reduction of the number of Divisional Agricultural Officers, which was recommended by the Retrenchment Commission, could not be given effect to without serious handicap to the development of the Colony's agricultural industries. In consequence, a Divisional Agricultural Officer (Mr. G. E. J. Hulugalle) was appointed to the North-Western

Division, and Mr. W. P. A. Cooke, Farm School Officer, Jaffna, was selected by a special scholarship for training in America in Rural Development and Agricultural Extension Work. A decision was also taken to build and equip a Chemical Laboratory at Peradeniya during the year, and to proceed to the appointment of a whole time chemist at an early date. The further training of Sub-Inspectors for plant pests and diseases has been undertaken, so as to have subordinate officers available when the North-Western Division of plant pest and disease inspection is established. It has also been found necessary to detail a Sub-Inspector for plant pests and diseases to the Batticaloa District.

40. Departmental examinations were held in the months of January and July as follows:—

January.

Probationers' Examination (Agricultural Branch and Vernacular Instructors' Examination).
Probationers' Examination (Research Branch).
Junior Departmental Examination (1—Agricultural, 2—Research, and 3—Field Branches).
Senior Departmental Examination (1—Agricultural, 2—Research, and 3—Field Branches).

July.

Probationers' Examination (Agricultural Branch and Vernacular Instructors' Examination).
Probationers' Examination (Research Branch).

41. The following officers passed the departmental examinations specified against their names:—

January Examination.

1.	P. A. Gooneratne ..	.. Probationers'
2.	George Madugalle ..	.. Probationers'
3.	V. G. Perera ..	.. Probationers'
4.	N. Thambiah ..	.. Probationers'
5.	B. G. Buultjens ..	.. Probationers'

July Examination.

1.	J. A. Rambukpota..	.. Probationers'
2.	T. C. de Sylva ..	.. Probationers'
3.	G. Seneviratne ..	.. Probationers'

42. The following officers passed the tests in the vernaculars specified against their names:—

January Examination.

1.	D. T. J. Weerasooriya	.. Sinhalese
2.	M. Amarasinghe ..	.. Sinhalese
3.	W. F. Seneviratne	.. Sinhalese
4.	Edwin de Alwis ..	.. Tamil

April Examination.

1.	V. G. Perera ..	.. Sinhalese and Tamil
2.	B. G. Buultjens ..	.. Sinhalese
3.	Gratiaen de Silva ..	.. Sinhalese
4.	N. Senathiraja ..	.. Tamil
5.	N. Thambiah ..	.. Tamil

July Examination.

1.	P. A. Gooneratne ..	.. Sinhalese
2.	George Madugalle ..	.. Sinhalese
3.	N. Thambiah ..	.. Sinhalese
4.	E. W. Dias Bandaranayake	.. Sinhalese
5.	A. Madanayake ..	.. Sinhalese
6.	J. A. Alles ..	.. Sinhalese
7.	S. Sinnathurai ..	.. Sinhalese
8.	W. Molegode ..	Tamil

October Examination.

1.	D. A. W. Ranasinghe	.. Sinhalese and Tamil
2.	T. C. de Sylva ..	.. Sinhalese and Tamil
3.	G. Seneviratne ..	.. Sinhalese
4.	G. G. Auchinleck ..	.. Sinhalese
5.	F. A. Sandrasagara	.. Tamil
6.	L. S. Bertus ..	.. Tamil
7.	G. V. Wickremasekere	.. Tamil

BOARD OF AGRICULTURE.

43. The following appointments were made to the Board of Agriculture during the year:—

Estate Products Committee.

Mr. J. E. P. Rajapakse *vice* the Hon. Mr. H. L. de Mel, C.B.E.
Mr. A. A. Bowie *vice* Mr. J. Graeme Sinclair.
Mr. A. M. C. Dias *vice* the Hon. Mr. James Peiris.
Sir S. D. Bandaranaike (reappointed).
Mr. John Horsfall *vice* Lt.-Col. L. Bayley.
Mr. L. A. Wright *vice* Mr. N. G. Campbell.
Mr. D. S. Senanayake *vice* Mr. A. P. Goonetilleke.
Mr. W. R. Mathew *vice* Mr. A. C. Mathew.
Mr. Allen Coombe *vice* Mr. J. W. Oldfield.
Mr. R. Garnier (reappointed).

Food Products Committee.

Hon. Mr. T. B. Panabokke *vice* Mr. P. B. Nugawela.
Mr. W. R. Jacks *vice* Mr. R. A. Senior-White.

44. The following matters were discussed by the Board of Agriculture and its various Committees during the year :—

Board of Agriculture.

The adulteration of citronella oil.
The present position regarding the cultivation of tobacco for the European market.
The present position regarding cotton cultivation in the Hambantota District.
Mudaliyar E. F. Edirisinghe's motion that agricultural education be made compulsory in all village and town schools and colleges in the Island.
Soil erosion.

Estate Products Committee.

Progress Report, Experiment Station, Peradeniya.
Results of experiments on tea manuring, rubber tapping, manioc, sweet potatoe, &c.
Tea termites.
Black bug on tea.
The desirability of printing leaflets on kapok cultivation in the vernaculars and circulating them all over the Island through the agency of the revenue officers.
What is the best treatment for estates which have suffered from effects of drought ?
Correspondence relating to diseases of coconuts, specially bud-rot, and the failure of the Plant Pest Board to deal promptly with a case reported recently in the Kurunegala District.
(1) Brown bast and its inducement by change-over tapping. (2) Is the half spiral not too drastic a form of tapping taking 20 per cent. more latex than the $\frac{1}{2}$ or 45 per cent. more than the $\frac{1}{4}$ system ?
The establishment of a properly equipped chemical laboratory for research work in tea and the submission of a scheme for same to the Planters' Association and Ceylon Estates Proprietary Association for their consideration and support financially.
Equipment of Experiment Station, Peradeniya.
Forking old rubber and the value of silt pits.
Plant pests and diseases legislation.
Progress Report of the Experiment Station, Peradeniya.
Results of manurial experiments with tea.
Results of manurial experiments with rubber.
Results of tapping experiments with rubber.
Two- and three-day tapping experiments (new series).
Single " V " and one cut to the left.
Individual yield experiments.
Alternate day and daily in alternate month experiments.
Progress Report, Experiment Station, Peradeniya.
Effects of manures on healing of galleries made by shot-hole borer.
Increase of *Lecanium viride* on tea and methods of prevention and cure.
The probable incidence of disease in tea from the death of albizzia trees: (*a*) naturally, (*b*) as the result of overlopping.
Notes on analyses of some up-country tea soils yielding both quantity and quality.
Lime stones of Ceylon.
Whether silt pits in rubber are suitable as receptacles for manures ?
Whether (*a*) *Mimosa invisa* has been tried in Ceylon as a cover crop, and, if so, with what success ? (*b*) Have any further experiments or investigations been made with regard to cover plants for prevention of soil wash ?
Black beetle on coconut estates : How to destroy them and keep back the mulch ?
Investigation of the cause of the tapering of coconut trees.
What measures should be adopted to exterminate the flying fox from the Island ?
Does any evidence exist which points to various grass seeds having been disseminated on estates by an application of artificial fertilizers ?
Ceylon kapok.
Progress Report, Experiment Station, Peradeniya.
Chilaw coconut experiments-results for 1922.
Negombo coconut experiments-results for 1922.
Are there any experiments being carried out in the manuring of coconuts to determine what manures or what methods of manuring are likely to increase the weight of meat in the nut ?
Cotton experiments at Ambalantota for 1922–23.
For coconuts, instead of using a few pounds each of several nitrogenous manures, is it unsafe to take advantage of fluctuations in the manure market and supply all the necessary nitrogen from one manure only, *e.g.*, fish, at present ?
Is there a reliable cheap phosphatic manure for coconuts on the market to replace bone meal ?
Die-back in Uva.
Brief report by Entomologist on methods of application of lead chromate.
Report on Acacia barks sent to Imperial Institute for analysis and valuation.
Progress Report, Experiment Station, Peradeniya.
Suggested modification of the Chilaw coconut trials.
Fodder trial report.
Fermentation of cacao.
Whether deep planting of coconuts is " absolutely essential " as stated by Mr. Rajapakse in his address on coconut cultivation at Gampaha, or whether it is not on the contrary most inadvisable ?
Progress Report of the Experiment Station, Peradeniya.
Consideration of the Report of the Sub-Committee on the Equipment of the Experiment Station, Peradeniya.
Soil erosion.
Importation of tea seed.
Acacia decurrens in tea.
Planting of Oxalis on low-country tea estates.
Borer in red toona.
Planting coconuts in triangles rather than in squares.
The application of manures by broadcasting rather than round the palms.
Outline of experiments for the proposed Coconut Experiment Station.